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ABSTRACT

This part of the study described in SE 013 619 lists 770 doctoral dissertations which were completed in the United States from 1930 through 1970 and which dealt with mathematics education at the secondary level. The same style of cataloging and annotation is used as in Volume I. Because the listing was made from "Dissertation Abstracts," none of the studies were evaluated. This volume also contains a summary of the data obtained in this project. (MM)

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FINAL REPORT
Project No. 1-C-004
Grant No. OEG-3-71-0085

ANNOTATED COMPILATION OF RESEARCH ON SECONDARY SCHOOL MATHEMATICS, 1930-1970

VOLUME 2:
COMPILATION OF DISSERTATIONS
SUMMARY AND CONCLUSIONS

Marilyn N. Suydam

The Pennsylvania State University
University Park, Pennsylvania 16802

February 1972

U.S. DEPARTMENT OF
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The research reported herein was performed pursuant to a grant with the Office of Education, U.S. Department of Health, Education, and Welfare. Contractors undertaking such projects under Government sponsorship are encouraged to express freely their professional judgment in the conduct of the project. Points of view or opinions stated do not, therefore, necessarily represent official Office of Education position or policy.

U.S. DEPARTMENT OF
HEALTH, EDUCATION, AND WELFARE

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National Center for Educational Research and Development
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ABSTRACT

The intent of the project was to provide, within limitations, a reference source for educators and researchers who teach and study secondary school mathematics.

1. A list of all reports of research which relate to the teaching of mathematics in the secondary school and which have been printed in journals published in the United States from 1930 through 1970 was compiled. A total of 780 research reports was found in 59 journals and in Educational Resources Information Center (ERIC) records.

2. A list of dissertations which were completed in the United States from 1930 through 1970 was compiled. A total of 770 dissertations was located.

3. Each study was analyzed and categorized by mathematical topic, type of study, design paradigm, sampling procedure and size, statistical procedure, level, duration, type of test, and variables (when appropriate).

4. Reports of experimental research were evaluated.

5. Each report and dissertation was annotated, with the major findings which appear to be supported by the data noted.

6. Pertinent data about the compilation were summarized.

PREFACE

Thanks are due to many people who assisted in developing this compilation. Florence Hammonds spent much time in the library, searching for appropriate reports. Beverly Brooks not only served as coordinating secretary, but also did much checking to ascertain accuracy. Kathy Harris and Joyce Axtell helped both with the collection and with the preparation of the final report. John Gregory, of the ERIC Center for Science, Mathematics, and Environmental Education, helped in analyzing some of the research reports, while Richard Swanson aided in the search for documents.

To them, and to the many unnamed, thank you . . . .

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VOLUME 2

COMPILATION OF DISSERTATIONS
SUMMARY AND CONCLUSIONS

This second volume of the compilation of research on secondary school mathematics includes all of the introductory information presented in Volume 1. The reason for this is that readers may not have the first volume available, and much of that introductory material is as pertinent to Volume 2 as it was to Volume 1--especially for those attempting to decode and use the compilation.

If the reader has perused Volume 1, he can turn directly to page 11. If not, read on!

I. Introduction

In 1967, a compilation of the research on elementary school mathematics, grades kindergarten through eight, was completed.[1]

In 1969, this was updated and made more inclusive.[2]

There still existed a need for a compilation of the research on secondary school mathematics. That is the purpose of these two volumes: to present a compilation of research articles and dissertations in which the teaching of mathematics in grades 7 through 12 is the focus.

This compilation, like those for elementary school mathematics, is more than just a bibliographic listing. Each report has been annotated, categorized, and evaluated. The intent is to provide, within limitations, a reference source for teachers in the secondary school, for teachers of teachers, and for researchers at both pre-doctoral and post-doctoral levels.

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[1] Suydam, Marilyn N. An Evaluation of Journal-Published Research Reports on Elementary School Mathematics, 1900-1965. Unpublished doctoral dissertation, The Pennsylvania State University, 1967.

[2] Suydam, Marilyn N. and Riedesel, C. Alan. Interpretive Study of Research and Development in Elementary School Mathematics, Final Report, Phase I. U.S.O.E. Grant No. OEG-0-9-480586-1352(010). June 1969.

Need for Compilations of Research

The need for research has been noted increasingly, as we assess the status of the mathematics curriculum and of mathematics teaching. Many who plan research and development activities are not familiar with previous research. One of the difficulties which any researcher faces is locating those studies which will be of most use to him. As he begins to search in the literature, he finds that there is no one source of information on this research: he must spend time searching through many sources. Therefore a compilation can serve as a valuable tool. This compilation is categorized and annotated so that desired information can be located in a minimum amount of time.

One other facet must also be considered: the need to evaluate research. We frequently read about studies that are not well-designed, or in which data are incorrectly gathered or analyzed, or where results are for one reason or another not applicable. Since research efforts vary widely in quality, the question of how much confidence can be placed in the findings of a study is one of considerable importance. An evaluation of reports of experimental research, which provides an indication of their current validity, is an essential aspect of this compilation. Such evaluation can serve as a guide to researchers and to others using the compilation.

Scope of This Compilation

The research reports and dissertations listed in this report all relate to secondary school mathematics education, grades 7 through 12. Some of these were included in the listing of research on elementary school mathematics; indeed, some of them were done with pupils in the elementary grades as well as from the secondary school. They are cited in this compilation as well to make it more comprehensive for secondary school educators.

The objectives for the project were:

1. To compile a list of reports of research printed in journals published in the United States, reports of research documented in the Educational Resources Information Center (ERIC) records, and dissertations completed in the United States between 1930 and 1970.

2. To analyze and categorize the research reports and dissertations by mathematical topic, type of study, design paradigm, sampling procedures and size, statistical procedures, level, duration, type of test, and variables.

3. To annotate the research reports and dissertations.

4. To evaluate each report of experimental research. (No evaluation of dissertations is given.)

5. To prepare a printed report which will make the compilation readily available to mathematics educators.

Limitations of This Compilation

This compilation has other limitations aside from those imposed by the scope. It is not complete, comprehensive, or free from error, despite attempts to make it so. The most serious limitation is due to human error. Undoubtedly some reports and dissertations were missed in the searching process, some were miscategorized and/or misfiled, and some details were overlooked and/or misread. The errors must and will be corrected as the compilation is used. Anyone who locates any errors can aid in this task by calling attention to them.

II. Procedures

It is easier to tell what was done than to describe the order in which it was done. Perhaps it is sufficient to indicate that all of the following were generally proceeding simultaneously!

A. Compiling a list of research reports and dissertations which were printed between 1930 and 1970 by:
   1. Searching appropriate journals and cross-checking this search by use of Education Index, Current Index of Journals in Education, previous partial listings, and references cited in articles.
   2. Searching ERIC lists, including Research in Education, for research projects.
   3. Searching Dissertation Abstracts and cross-checking this search with Dissertation Abstracts International Retrospective Index, previous partial listings, and references cited in articles.

B. Categorizing the research reports and dissertations; the categories are described in the following section.

C. Annotating and evaluating the research reports. These are parallel tasks: to do the first demands careful reading which facilitates the second. Only major findings which appear to be supported by the data were noted. This annotation was not intended to be an abstract of the study. The attempt was to present sufficient information so that the reader can decide whether or not to refer to the original study.

The Instrument for Evaluating Experimental Research Reports was developed to serve as a tool in evaluating one significant type of research. Other types of research can also be evaluated, but time precluded such evaluation in this project. The comments and criticisms made by researchers through the years were collated; nine points were found to be repeated again and again:

1. Importance or significance of the problem
2. Definition of the problem
3. Design of the study
4. Control of variables
5. Sampling procedures
6. Use of instruments
7. Analysis of data
8. Interpretation of results
9. Reporting of the research

These nine points form the basis for the questions which comprise the instrument. In addition, certain "key points" are provided for consideration in ascertaining a rating for each question, with a pair of adjectives intended to focus the attention of raters on the same pertinent aspects of each question. The Instrument is included in Appendix E.

Two investigations of the degree of reliability of interrater agreement which could be expected in the use of the instrument have been reported.[3] In the first study, the interrater agreement was found to be .91, while the coefficient of reliability which provides a measure of the consistency probable with a single rater using the instrument is .77. In the second and more extensive study, the interrater agreement was .94, while the coefficient for a single rater was .57.

The instrument is used only with reports, not with abstracts. The limitations of abstracts make the reason for this evident: too little information can be provided in an abstract to assure valid use of the evaluation instrument.

D. Preparing this report. In the next section, a description of how to decode and use the compilation is given. This is followed by the annotated listing of journal articles and ERIC documents in this volume, and by the annotated listing of dissertations in Volume 2. Summaries of pertinent data are then given, and trends of the research briefly discussed. Each volume includes appendices; among these are alphabetical listings of articles and of dissertations.

Explanation of Coding for the Compilation

The format of the compilation parallels that used in the compilations on elementary school mathematics.[4, 5] The mathematical topic is indicated at the top of each page; the list of these topics, developed pragmatically from the subject and from the research may be found in Appendix A. The pages are grouped by topic, with studies listed in alphabetical order by author. Cross references are listed on the final page for each topic; only the author and the mathematical topic under which the reference may be located are cited. After each primary reference the major findings of the study are presented. When an annotation is not included, it is because the actual study or dissertation could not be located, although the reference indicates that it is pertinent to secondary school mathematics.

---

[3] Suydam, Marilyn N. An Instrument for Evaluating Experimental Educational Research Reports. Journal of Educational Research 61: 200-203; January 1968.

[4] Suydam, 1967, op. cit.

[5] Suydam and Riedesel, op. cit.

When applicable, the primary independent and dependent variables are then noted. After this, there are two or three lines which present, when it is appropriate to the type of study and when ascertained from the report, information for the following nine categories:

1. Type of study: Many categories have been suggested by writers in the field of educational research. Similarities and differences from the definitions used by others may be noted. The definitions of descriptive, survey, case study, action, correlational, ex post facto, and experimental research used in this compilation may be found in Appendix B.

2. Design paradigm: The initial source of paradigms, or basic models which approximate a description of the procedures, was Campbell and Stanley.[6] However, modifications and additions were necessary in

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[6] Campbell, Donald T. and Stanley, Julian C. Experimental and Quasi-Experimental Designs for Research on Teaching. In Handbook of Research on Teaching. (Edited by N. L. Gage.) Chicago: Rand McNally and Co., 1963. Pp. 171-246.

order to classify actual research. Sparks[7] has given more precise explanations of each of the paradigms, which are listed in Appendix C.

3. Sampling procedure: Three essential factors to consider about sampling involve identification of (1) the population, (2) the sample and how it was selected, and (3) how treatments (if any) were assigned to the sample groups. These are presented by using the numeral which corresponds to the above aspect, and then a symbol: only, used after 1 when only the population was identified; r, for random; m, for matched; and s, for selected, used when no additional specific information was given.

4. Sample size: This is stated in terms of the total number of students and/or classes which were involved in analysis of the data.

5. Statistical procedure: The basic list of the types of statistical procedure or test used in a study was that proposed by Tatsuoka and Tiedeman.[8] As additional statistics were found in research reports, they were included in the list, which is presented in Appendix D. The basic division is between descriptive and inferential statistics. Descriptive statistics do not (readily) lend themselves to generalization, while this is one of the characteristics generally applied to inferential statistics.

---

[7] Sparks, Jack N. Research Paradigms. Monograph prepared for Pennsylvania Department of Public Instruction, 1967.

[8] Tatsuoka, Maurice M. and Tiedeman, David V. Statistics as an Aspect of Scientific Method in Research on Teaching. In Handbook of Research on Teaching. (Edited by N. L. Gage.) Chicago: Rand McNally and Co., 1963. Pp. 142-170.

6. _Grade level_: The grade level of the pupils with whom the research was conducted is noted. When no grade level was specified, either age level or grade level to which the findings might be applicable were noted.

7. _Duration_: The time involved in conducting the research study is noted, with retention interval (if any) stated separately.

8. _Type of test_: "Norm" indicates that the test used in the study is a standardized instrument, for which data on a large sample or samples are available. "Non-norm" indicates a test for which such data are not available. In the majority of these cases, the test was constructed by the researcher.

9. _Qualitative value_: This information was obtained by application of the Instrument for Evaluating Experimental Research Reports. The sum of the numerical scores assigned to each question may be considered as a basis for some degree of comparison. A total of 9 to 12 would indicate that the report seems excellent in terms of the criteria; 13 to 20, very good; 21 to 28, good; 29 to 36, fair; and 37 to 45, poor. It should be recognized that the primary use of these scores should be to serve as an _indication_ of the degree of validity to be expected from the findings as projected from the report.

The coding which is used in the compilation parallels the alphanumeric designations on the outlines of categories presented in Appendices A, B, C, and D. Dashes are used to indicate that information was not available, not applicable, or not located.

An example of how this information will be presented on the pages which follow is contained in Figure 1.

e; 3.4; 2-s, 3-r; 5 classes; 3.2; gr. 4; 5 wks.; norm;

27 (3, 2, 3, 3, 2, 4, 3, 4, 3).

Figure 1

CODED INFORMATION FORMAT FOR THE NINE CATEGORIES

Each bit of information refers to one of the nine points, in order. What this indicates is illustrated or interpreted in Figure 2.

	Information	Given "code"	"Translation" from lists
1.	Type of study	e	experimental
2.	Design paradigm	3.4	pretest-posttest, insufficient information about sampling
3.	Sampling procedure	2-s, 3-r	sample selected, randomly assigned to treatment
4.	Sample size	5 classes	5 classes
5.	Statistical procedure	3.2	analysis of variance
6.	Grade level	gr. 4	grade 4
7.	Duration	5 wks.	5 weeks
8.	Type of test	norm	normative test
9.	Qualitative value	27(3,2,3,3,2,4,3,4,3)	total value, 27; other numerals are those assigned to each question on the Instrument for Evaluating Experimental Research Reports

Figure 2

EXAMPLE OF DECODED INFORMATION FOR THE NINE CATEGORIES

Dissertations on Secondary School Mathematics

Historical developments (a-1)

Berenson, Lewis Jay. The Adaptation of High School Mathematics to Mass Education: 1915 to 1925. (Columbia University, 1961.) *Dis. Abst.* 22: 1053-1054; Oct. 1961. (b-4)

In the decade studied, curriculum revision to provide interesting and applicable content in grades 7-9 was predominant, with high schools maintaining a college-preparatory program.

d; ---; ---; ---; ---; grs. 7-12; ---; ---.

Brown, Claude Harold. The Conflict Between the Theoretical and the Practical in Mathematics and Mathematics Teaching. (University of Kansas, 1940.)

Coleman, Robert, Jr. The Development of Informal Geometry. (Columbia University, 1942.) (c-23)

Fishman, Joseph. Trends in Secondary School Mathematics in Relation to Educational Theories and Social Changes: 1893-1964. (New York University, 1965.) *Dis. Abst.* 27A: 990-991; Oct. 1966. (b-3)

Until the early 1950's, societal pressures had resulted in a continuous decrease in the percentage of students enrolled in academic mathematics courses and a dilution of the content of courses offered to a majority of students. The reform movement led to new programs for the talented, with some attempt to improve the mathematics education of the less gifted.

d; ---; ---; ---; ---; sec.; ---; ---.

Freitag, Herta Taussig. The Use of the History of Mathematics in Its Teaching and Learning on the Secondary School Level. (Columbia University, 1953.) *Dis. Abst.* 14: 143-144; Jan. 1954.

The values of fusing mathematics with its history are discussed.

d; ---; ---; ---; ---; sec.; ---; ---.

Historical developments (a-1)

Grabenheimer, Ruth. Academic Mathematics in New York City Public Schools. (Columbia University, 1961.) *Dis. Abst.* 21: 3713; June 1961. (b-3)

Changes in the mathematics program reflect both national and state influences.

d; ---; ---; ---; ---; ---; ---; ---.

Hinckeley, Rachel Francelia. American Culture as Reflected in Mathematical Schoolbooks. (Columbia University, 1950.) (d-1)

Huber, Sister Mary Lawrence. Developments in Mathematics Education at the Junior High School Level Since the Turn of the Century. (The University of Buffalo, 1962.) *Dis. Abst.* 23: 2927-2928; Feb. 1963. (b-4)

The lack of change in programs, between 1890 and 1950, despite many recommendations, was noted. Inadequately prepared teachers, textbooks unresponsive to proposed changes, insufficient consideration of student evaluations, and lack of inclusion of newly developed mathematical content were cited as reasons.

d; ---; ---; ---; ---; grs. 7-9; 71 yrs.; ---.

Hunte, Beryl Eleanor. Demonstrative Geometry During the Twentieth Century: An Account of the Various Sequences Used in the Subject Matter of Demonstrative Geometry from 1900 to the Present Time. (New York University, 1965.) *Dis. Abst.* 26: 3979; Jan. 1966. (c-23)

Stress in modern programs is placed on perfecting the postulational base of Euclid and on illustrating the unity of mathematics in the view that geometry is concerned with sets of points.

d; ---; ---; ---; ---; ---; ---; ---.

Ibrahim, Abdel Aziz E. Philosophies of Education: Their Implications for Mathematics Curricula and Classroom Procedures. (Ohio State University, 1949.) (b-3)

Jamshaid, Mohammad. A Study of the Forces That Have Influenced Change in Secondary School Mathematics (Grades 7-12) in the United States Since World War II and the Possible Implications for Pakistan. (Indiana University, 1968.) Dis. Abst. 29A: 2890; Mar. 1969. (a-7, b-3)

The first reform movement (in 1900) was child and society centered; the second (1950) was subject centered. Influences that led to change were analyzed and considered in relation to changes in Pakistan.

d; ---; ---; ---; ---; grs. 7-12; ---; ---.

Krause, Marina Caroline. The Modern Mathematics Movement: Evolution and Implications. (Arizona State University, 1969.) Dis. Abst. 29A: 2539; Feb. 1969. (a-4)

Educators and mathematicians who contributed to the movement were identified, as was "ample" evidence of the evolution of modern mathematics from 1936-1957.

d; ---; ---; ---; ---; grs. K-12; ---; ---.

Lichtenberg, Donovan Royce. The Emergence of Structure in Algebra. (The University of Wisconsin, 1966.) Dis. Abst. 28A: 543; Aug. 1967. (c-22)

The evolution of algebra between 1830 and 1900 was analyzed.

d; ---; ---; ---; ---; ---; ---; ---.

Nelson, Ira Irl. Changes in Materials and Methods in Elementary Algebra from 1829 to 1929. (University of Texas, 1932.) (a-4, c-22, d-1)

Oakes, Herbert Irving. Objectives of Mathematics Education in the United States from 1920 to 1960. (Columbia University, 1965.) Dis. Abst. 26: 908; Aug. 1965.

A gradual evolution in the type and number of objectives for mathematics education was found.

d; ---; ---; ---; ---; grs. K-12; ---; ---.

Historical developments (a-1)

Pickard, Willis L. Evolution of Algebra as a Secondary School Subject. (George Peabody College for Teachers, 1948.) (c-22)

Pruitt, Ralph Lewis. An Analysis of Types of Exercises in Plane Geometry Texts in the United States from 1878 to 1966. (The Ohio State University, 1969.) Dis. Abst. 30A: 1414; Oct. 1969. (c-23, d-1)

The trend of everyday-life exercises in textbooks was upward from 1878-1959, and downward since then. After 1938, exercises on patterns of reasoning increased.

d; ---; ---; ---; ---; gr. 10; ---; ---.

Quast, William Garfield. Geometry in the High Schools of the United States: An Historical Analysis from 1890 to 1966. (Rutgers - The State University, 1968.) Dis. Abst. 28A: 4888; June 1968. (b-3, c-23)

Reasons for why it has been difficult to modify the geometry course are presented after analysis of recommendations and practices.

d; ---; ---; ---; ---; gr. 10; ---; ---.

Ripley, Ruth. Important Educational Factors Conditioning Secondary School Mathematics in the United States Since 1890. (Yale University, 1947.)

Saidel, Frank. A History of the Purposes, Content, and Grade Placement of Business Arithmetic in General Education in the United States Since 1890. (Columbia University, 1952.) Dis. Abst. 13: 58-59; Issue No. 1, 1953. (a-2, c-26)

Most of the arithmetic of business was taught in grade 7 until about 1925, when a large variety of new topics was added in grade 8. Emphasis has shifted from vocational to personal aims in all courses through grade 12.

d; ---; ---; ---; ---; grs. 7-12; ---; ---.

Schuler, Nevin Deily. The Effect of the Administration of Two Federal Laws on Secondary Mathematics in Selected States. (The Pennsylvania State University, 1962.) Dis. Abst. 23: 4200-4201; May 1963. (t-2d)

NSF and NDEA have aided in improving teacher background and student attitude, increasing course offerings, and changing state departments.

d; ---; ---; ---; ---; grs. 7-12; ---; ---.

Sigurdson, Solberg Einar. The Development of the Idea of Unified Mathematics in the Secondary School Curriculum 1890-1930. (The University of Wisconsin, 1962.) Dis. Abst. 23: 1997; Dec. 1962. (a-2)

From its original use with a course in which algebra and geometry were taught in a parallel manner, "unified mathematics" is traced through stages of science-mathematics correlation, applied problems, and social or general mathematics.

d; ---; ---; ---; ---; grs. 7-12; ---; ---.

Stubblefield, Betty Irene. The Development of the Mathematics Curriculum in the Chicago Public High Schools from 1856 to 1962. (Northwestern University, 1964.) Dis. Abst. 25: 3377-3378; Dec. 1964. (b-3)

Requirements, courses, content, aims, and educators in Chicago schools were cited.

d; ---; ---; ---; ---; sec.; ---; ---.

Wilson, Jack D. Trends in Elementary and Secondary School Mathematics, 1918-1948. (Stanford University, 1950.)

Yasin, Said Taha. The Reform Movement in Secondary Mathematics - Its History and Present State. (Indiana University, 1961.) Dis. Abst. 22: 3084; Mar. 1962. (b-3)

Reform movements since 1900 were traced. Stages were defined by concern for the learner, attempts to reduce mathematics courses, inclusion of new topics, weakening of content, and recent improvements.

d; ---; ---; ---; ---; ---; ---; ---.

Historical developments (a-1)

Other References

Albrecht, 1958	(c-23)
Barbeau, 1969	(t-1b)
Barto, 1967	(b-3)
Bedwell, 1966	(d-8)
Beninati, 1964	(b-3)
Berg, 1965	(t-1b)
Hancock, 1961	(b-3)
Hawthorne, 1966	(b-3)
Horne, 1967	(a-7)
Izzo, 1957	(c-17)
Jahn, 1969	(a-7)
Kelley, 1960	(b-3)
King, 1955	(d-1)
Leonard, 1967	(f-1b)
Lohela, 1958	(t-1d)
Mock, 1959	(t-1b)
Nielson, 1955	(b-3)
Rajaratnam, 1958	(d-1)
Rudnick, 1962	(b-3)
Schumaker, 1960	(t-1b)
Sligo, 1955	(f-1b)
Smith, 1965	(a-2)
Warner, 1965	(d-4)
Wilson, John Donald, 1959	(d-1)

Bell, Max S. Studies with Respect to the Uses of Mathematics in Secondary School Curricula. (The University of Michigan, 1969.) Dis. Abst. 30A: 3813-3814; Mar. 1970. (d-1)

Teachers supported the need for more emphasis on the uses of mathematics, though were generally not given pre- or in-service training for this. Analysis of algebra texts revealed little included on uses, though a pilot study indicated that emphasis on uses harmonized with a variety of objectives in algebra.

s; ---; ---; ---; ---; sec.; ---; ---.

Lauda, Billy George. Utilization of Secondary School Sites in Fulfilling the Objectives of Teaching Art, Mathematics, and Science in Pennsylvania. (University of Pittsburgh, 1963.) Dis. Abst. 26: 825-826; Aug. 1965.

Mathematics teachers made little use of the outdoor school site.

s; ---; ---; ---; ---; grs. 10-12; ---; ---.

Lyda, Wesley John. A Study of Grade Placement of Socially Significant Arithmetic Problems in the High School Curriculum. (Indiana University, 1943.) (a-5b, b-3, b-5)

Myrick, Alvin Grant. Some Effects of Space Science Materials Upon Student Achievement in Mathematics. (Duke University, 1969.) Dis. Abst. 30B: 3757; Feb. 1970. (d-8)

Those in the group in which applications with space-science materials were used scored significantly higher than those in the group not using such applications.

(I) use of space science applications; sex; IQ. (D) achievement gain-difference scores.

e; 3.1; 2-s, 3-m; 2 classes; 3.2, 3.4, 6.2; Algebra II; 1

semester; non-norm.

Risinger, G. Consumer Information in Eighth Grade Mathematics. (Rutgers University, 1949.)

Nature, values, and uses of mathematics (a-2)

Smith, Charles Leonard. Absolute Value and Inequalities: Applications in Secondary School Mathematics. (Columbia University, 1964.) *Dis. Abst.* 26: 396-397; July 1965. (a-1, b-3)

It was concluded that inequalities and absolute value are important in current programs. Providing background for teachers is necessary.

d; ---; ---; ---; ---; ---; ---; ---.

Walter, Lina Rubright. Appreciation in Mathematics. (Columbia University, 1963.) *Dis. Abst.* 24: 2065-2066; Nov. 1963.

Viewpoints on the nature of appreciation of mathematics are expressed.

d; ---; ---; ---; ---; sec.; ---; ---.

Other References

Bush, 1959	(c-20)
Carter, 1957	(b-3)
Clewell, 1965	(d-8)
Hesch, 1956	(t-2)
Ilioff, 1957	(f-3)
McDermott, 1967	(t-2b)
Saidel, 1953	(a-1)
Sigurdson, 1962	(a-1)
Zoll, 1958	(c-23)

Bachman, Alfred Morry. Factors Related to the Achievement of Junior High School Students in Mathematics. (University of Oregon, 1968.) Dis. Abst. 29A: 2139; Jan. 1969. (a-6, e-4, f-2b, f-4)

No significant differences were found for students taught by homeroom or special teachers, whether grouped heterogeneously or homogeneously. A positive relationship between self-concept and achievement was found, though IQ was the variable most significantly related to achievement.

(I) organizational pattern. (D) achievement; attitude.

f; ---; 2-r, 3-s; 404 students; 3.5, 3.13; gr. 7; ---; norm, non-norm.

Campbell, Azzie Leely. A Comparison of the Effectiveness of Two Methods of Class Organization for the Teaching of Arithmetic in Junior High School. (The Pennsylvania State University, 1964.) Dis. Abst. 26: 813-814; Aug. 1965. (e-4)

No significant differences in achievement were found between groups having whole-class instruction or grouping with the class. Teachers were favorable toward the grouping procedure.

(I) use of within-class-grouping or whole-class method.
(D) achievement; attitudes.

e; 3.4; ---; 8 classes; ---; gr. 7; ---; ---.

Chiotti, Joseph Frank. A Progress Comparison of Ninth Grade Students in Mathematics from Three School Districts in the State of Washington, With Varied Methods of Grouping. COSC 23: 81-86; 1961. (e-4)

No significant differences in achievement were found among students in ungraded, homogeneous, or heterogeneous groups.

(I) ungraded, homogeneous, or heterogeneous group. (D) achievement.

e; 3.4; 1-only; 3 schools; 3.2, 3.3; gr. 9; ---; norm.

Organizational patterns (a-3)

Cohen, Louis Sayles. An Investigation of the Effectiveness of Certain Scheduling Procedures on Mathematical Achievement of Junior High School Pupils. (University of Minnesota, 1970.) Dis. Abst. 31A: 1995; Nov. 1970.

No significant differences in achievement were found between groups using a modular curricular plan and an individualized instruction plan.

(I) three organizational plans. (D) achievement; attitude.

e; 3.16; 1-only; 443 students; 3.2; gr. 7; 1 yr.; norm.

Costantino, Peter Samuel. A Study of Differences Between Middle School and Junior High School Curricula and Teacher-Pupil Classroom Behavior. (University of Pittsburgh, 1968.) Dis. Abst. 30A: 614; Aug. 1969. (e-5, f-4)

Both types of schools were predominantly subject-matter-centered, with no measurable difference in curriculum content or instructional behaviors.

s; ---; 2-s; 6 schools; 3.4; grs. 7, 8; ---; ---.

Heger, Louis Frederick. A Comparative Study of Pupil Achievement Under Different Organization Plans for Seventh Grades. (The University of Nebraska Teachers College, 1963.) Dis. Abst. 25: 3933-3934; Jan. 1965.

Students in self-contained classrooms made the greatest gains on arithmetic problem solving and concepts tests, while those in core classrooms made the greatest gains on computation tests.

(I) three organizational patterns. (D) achievement.

f; ---; 2-s; 6 schools; 3.5; gr. 7; ---; norm.

Madden, Joseph Vincent. An Experimental Study of Student Achievement in General Mathematics in Relation to Class Size. (Arizona State University, 1966.) Dis. Abst. 27A: 631-632; Sept. 1966. (c-21, f-2)

Those of mean ability who were in classes of 70 to 85 students achieved significantly higher than those of mean ability in classes of 25 to 40 students.

(I) two class sizes. (D) achievement.

e; 3.4; 2-s, 3-s, r; ---; 3.2, gr. 9; 1 semester; norm.

Morrison, Roderick Ruel, Jr. A Study of the Effects of Departmental Organization on Academic Achievement in the Sixth and Seventh Grades. (University of Georgia, 1966.) Dis. Abst. 27A: 3270-3271; Apr. 1967.

The self-contained classroom students in middle socioeconomic class schools performed better on arithmetic reasoning and computation than did the departmental students.

(I) self-contained classroom or departmentalized. (D) achievement.

f; ---; 2-s; 1,337 students; 3.5; grs. 6, 7; ---; norm.

Paige, Donald Dean. A Comparison of Team Versus Traditional Teaching of Junior High School Mathematics. (Indiana University, 1966.) Dis. Abst. 27A: 1717-1718; Dec. 1966.

No significant difference was found in mathematical achievement, in the retention of mathematical achievement or in the relearning ability of students taught by the team teaching method or the traditional method. Student attitudes about helping each other, attending homogeneous classes, and moving from class to class, were not affected by the instructional technique.

(I) team teaching or single-teacher method. (D) achievement.

e; 3.1 r; 2-s, 3-m; ---; ---; grs. 7, 8; 2 yrs.; norm.

Sanders, Stanley Gordon. Differences in Mental and Educational Development from Grades Six Through Nine and Implications for Junior High School Organization. (The University of Iowa, 1966.) Dis. Abst. 27A: 1234; Nov. 1966. (e-4)

In mathematics as in most other subject areas, students in grades 6-8 do not constitute a more heterogeneous group (i.e., they tend to be more homogeneous) than do students in grades 7-9.

s; ---; 1-only; 4,000 students; ---; grs. 6-9; ---; norm.

Organizational patterns (a-3)

Stevenson, Robert Louis. The Achievement Gains in Mathematics of Seventh Grade Pupils When Achievement Grouping and Flexible Scheduling Are Employed in a Team Teaching Program. (New York University, 1966.) Dis. Abst. 27A: 3785-3786; May 1967.

Achievement gains were more related to group level than mathematical ability. Little difference was found between changers and non-changers on computation and appreciation. Changers were significantly better on concepts.

a; ---; 1-only; 1 class; 1.6; gr. 7; 1 yr.; norm, non-norm.

Stottlemyer, Richard G. Secondary School Classroom Space Requirements - A Study to Examine Relationships Between Gross Room Area Per Pupil and Academic Achievement. (University of Maryland, 1965.) Dis. Abst. 27A: 90; July 1966.

No significant differences in achievement on basis of amount of room area per pupil were found.

(I) classroom size. (D) achievement.

f; ---; 2-r, 3-r; ---; 3.2, 3.5; grs. 7-11; ---; ---.

Young, James Clark. An Evaluation of a Pontoon Transitional Design - Ninth Grade Low Ability Level Students. (University of Southern California, 1969.) Dis. Abst. 30A: 1931; Nov. 1969. (e-2b)

No significant differences were found between groups taught by a "pontoon-transitional" design or a traditional program, on either achievement or attitude measures. Girls in both groups scored significantly higher on mathematics posttests than did boys.

(I) pontoon-transitional or traditional organizational pattern.
(D) achievement; attitude.

e; 3.4; 1-only, ---; 2.6, 3.2, 3.5; gr. 9; 1 yr.; norm.

Other Reference

Lohr, 1969 (d-1)

Amidon, Edmund James. Dependent-Prone Students in Experimental Learning Situations. (University of Minnesota, 1959.) Dis. Abst. 20: 2095; Dec. 1959. (c-23, f-4)

Dependent-prone students taught a geometry topic learned significantly more when taught by "indirect" (question, praise) methods than by "direct" (expository, criticism) methods.

(I) "direct" or "indirect" teacher influence; student goal perception. (D) geometry achievement; phenomenological dependence.

e; 3.4; 2-s, 3-s; 140 students; ---; gr. 8; 2 hrs.; ---.

Ashton, Sister Madeleine Rose. Heuristic Methods in Problem Solving in Ninth Grade Algebra. (Stanford University, 1962.) Dis. Abst. 22: 4289; June 1962. (a-5b, c-22)

The heuristic (inductive) method resulted in greater gains in problem-solving scores than did the textbook method.

(I) inductive or textbook method. (D) achievement.

e; 3.4; 2-s; 10 classes (243 students); 1.5, 3.4; gr. 9; ---; nonnorm.

Ayers, Gerald Hamilton. The Development and Evaluation of an Exploratory Course in Mathematics for Purposes of Educational Guidance in the Junior High School. (University of Southern California, 1934.)

Ballew, Julius Hunter. A Study of the Effect of Discovery Learning Upon Critical Thinking Abilities of High School Algebra Students. (The University of North Carolina at Chapel Hill, 1965.) Dis. Abst. 26: 3775; Jan. 1966. (c-22, g-4)

Significant improvement in critical thinking abilities was found in the classes taught by discovery exercises, though no difference in mathematics achievement scores was found.

(I) discovery or expository procedures. (D) achievement and critical thinking scores.

e; 3.4; 2-s, 3-s; 3 classes; 3.2, 3.4, 3.5; gr. 9; 18 wks.; norm.

Teaching approaches (a-4)

Barcaski, Peter Bartholomew. Cognitive and Motivational Factors, Methods of Teaching, and Their Effects on Achievement, Transfer, and Retention of Pre-Sequenced Concepts. (Columbia University, 1969.) Dis. Abst. 31A: 639; Aug. 1970. (c-15)

The Solved Examples-to-Concepts method resulted in highest achievement; the Concepts-and-Solved Examples method was next, and the Concepts-and-Unsolved Examples method was poorest. Neither IQ nor any motivational factor appeared to have a differential effect on achievement.

(I) three methods with varying kinds of directions; IQ; motivation. (D) achievement; transfer; retention.

e; 3.3 r; 2-s, 3-r; 313 students; 3.5, 6.4; gr. 9; 3 days (retention, 7 wks.); non-norm.

Becker, Jerry Page. An Attempt to Design Instructional Techniques in Mathematics to Accommodate Different Patterns of Mental Ability. (Stanford University, 1967.) Dis. Abst. 28A: 957-958; Sept. 1967. (c-22, c-30, d-5)

No significant interaction effects were found between aptitude and type of program used.

(I) expository or small-step programs; aptitude. (D) achievement; transfer.

e; 2.8; 2-m, 3-r; 70 students; 3.13; gr. 9; ---; non-norm.

Blair, Frank S. A Comparison of Programmed Instruction and the Conventional Lecture-Discussion Method of Instruction in Teaching Algebra I in the Ogden City Schools. (Brigham Young University, 1963.) Dis. Abst. 24: 4465-4466; May 1964. (c-22, d-5)

Groups taught by a conventional lecture-discussion method made a significantly greater gain in achievement in significantly less time than those taught by a programmed learning method.

(I) programmed learning or conventional instruction. (D) achievement gain-difference scores.

e; 3.4; 1-only; 10 classes (269 students); 6.2; gr. 9; ---; norm, non-norm.

Brown, Lynn Harold. A Comparison of a "Teaching for Thinking" Approach and a Conventional Approach to the Teaching of Algebra I. (The University of Iowa, 1969.) Dis. Abst. 30A: 3850-3851; Mar. 1970. (c-22, d-1)

When achievement was measured by an experimenter-made test, the group using the guided-lesson materials scored significantly higher than those using a conventional text, but no significant differences were found on a standardized test. Neither attitude nor ability to transfer was significantly different.

(I) use of conventional text or guided-lesson materials.
(D) achievement difference scores; attitude; transfer; ability to use proofs.

e; 3.7; 2-s, 3-r; 8 classes (170 students); 3.2, 3.5; gr. 9; 12

wks.; norm, non-norm.

Brownman, David E. Measurable Outcomes of Two Methods of Teaching Experimental Geometry: A Controlled Experiment with Parallel Equated Groups to Determine Immediate and Remote Achievement of the Lecture-Demonstration and Individual-Laboratory Methods. (New York University, 1938.) (c-23, g-2)

Carlow, Chester Dauphiny. A Study of Variables Within the Method of Individually Guided Discovery in Secondary School Mathematics: The Experimental Comparison of Conceptual Structures, Consolidation, and Learner's Personality with Learning, Retention, and Transfer by Ninth Grade College Preparatory Males. (Syracuse University, 1967.) Dis. Abst. 29A: 180; July 1968. (c-16)

The concept of ordered partitions was not significantly superior to the concepts of permutations and combinations. Those receiving 50 per cent practice attained mean retention-transfer approximately twice as great as those receiving no practice. Correlations among performance and personality scores were noted, suggesting that the personality factors of conceptual level and submissiveness are important in guided discovery learning.

(I) concepts of ordered partitions and permutations/combinations; level of practice after discovery. (D) number of hints required to make discoveries; time; retention; transfer.

e; 2.8 r; 2-r, 3-r; 36 boys; ---; gr. 9; ---; non-norm.

Teaching approaches (a-4)

Carry, Laroy Ray. Interaction of Visualization and General Reasoning Abilities with Instructional Treatment in Algebra. (Stanford University, 1968.) Dis. Abst. 29A: 475-476; Aug. 1968. (c-9, c-17, c-22, c-23, d-5)

A significant aptitude-treatment interaction was found for transfer scores after instruction on a graphical or analytical program.

(I) type of program; type of ability. (D) achievement; retention; transfer.

e; 2.4 r; 2-s, 3-r; 191 students; 6.2; gr. 10; 2 days; non-norm.

Clark, Van Deusen. A Comparison of the Achievement of SMSG Algebra Students and Modern Algebra Students Who Have Been Taught by Two Different Approaches. (Arizona State University, 1966.) Dis. Abst. 27A: 598-599; Sept. 1966. (c-22, d-9)

No significant differences in achievement on either a traditional test or one using non-routine-type problems were found between groups taking a two-year SMSG algebra course or one year of general mathematics and one year of algebra.

(I) type of program. (D) achievement.

e; 3.4; 2-s, 3-s; 56 students; 3.3, 3.5; grs. 9, 10; 2 yrs.; norm.

Cronin, Robert Emmet. The Effect of Varying Amounts of Traditional and Modern Mathematics Instruction Relative to Sex and Intellectual Ability on Both the Traditional and Modern Mathematics Achievement of Eighth Grade Pupils. (The Catholic University of America, 1967.) Dis. Abst. 28A: 2551; Jan. 1968. (e-6, f-2b)

Confusion or interference exists as a result of change in method of instruction; its effect is both retroactive and proactive.

f; ---; 2-s; ---; 3.2; gr. 8; ---; ---.

Davidson, Walter Witte. A Comparison of Student Achievement in High School Mathematics and Science Courses Based on the Instructional Approach Used in Eighth Grade Mathematics. (The University of Toledo, 1968.) Dis. Abst. 29A: 2514; Feb. 1969. (f-2c)

Students who had modern mathematics instruction in grade 8 achieved at a significantly higher rate and took more mathematics courses than those who had traditional instruction.

(I) modern or traditional program in grade 8. (D) success in high school mathematics and science courses.

f; ---; 1-only; 1 school system; 2.6, 3.5; sec.; ---; ---.

Davis, John B., Jr. An Investigation of the Interaction of Certain Instructional Strategies with the Structure of Basic Mental Abilities in the Learning of Some Mathematical Operations. (The Florida State University, 1967.) Dis. Abst. 28A: 2551-2552; Jan. 1968. (c-30, d-5, p-2)

Interaction between ability and content-presentation form were found; maximum achievement occurred when content form was congruent with a pattern of ability factors.

(I) semantic- or symbolic-form programs; aptitude. (D) achievement.

e; 3.16; 2-s, 3-r; ---; 6.2; gr. 10, college; ---; ---.

Denmark, Ewell Thomas, Jr. A Comparative Study of Two Methods of Teaching Elementary Algebra Students To Use the Algebraic Technique To Solve Verbal Problems. (The Florida State University, 1965.) Dis. Abst. 25: 5295-5296; Mar. 1965. (a-5b, c-22)

The deductive presentation appeared to be more effective for teaching algebraic problem solving techniques, while the inductive presentation facilitated the development of a variety of techniques.

(I) inductive or deductive presentation. (D) achievement; transfer.

e; 3.4; 2-s; 14 classes; 3.2; grs. 8, 9; ---; non-norm.

Ebeid, William Tawadros. An Experimental Study of the Scheduled Classroom Use of Student Self-Selected Materials in Teaching Junior High School Mathematics. (University of Michigan, 1964.) Dis. Abst. 25: 3427-3428; Dec. 1964. (d-3, d-9)

No significant differences in achievement or attitude were found between groups using SMSG texts with or without self-selected activities using a variety of mathematical materials.

(I) use of SMSG texts with or without self-selected activities.
(D) achievement; attitude scores.

e; 3.4; 1-only; ---; 3.5; grs. 7, 8; 1 yr.; norm, non-norm.

Teaching approaches (a-4)

Eldredge, Garth Melvin. Expository and Discovery Learning in Programed Instruction. (University of Utah, 1965.) Dis. Abst. 26: 5863; Apr. 1966. (d-5)

Tests of immediate and delayed transfer favored the high ability students using a guided discovery program over those using an expository program on rules for summary number series.

(I) guided discovery or expository programs. (D) transfer; retention.

e; 3.8 r; ---; ---; 3.5; gr. 9; ---; non-norm.

Fremont, Herbert I. Individualized Instruction in Plane Geometry: A Comparison of the Relative Effectiveness of Learning Plane Geometry by an Individualized Approach as Contrasted with the Traditional Approach of Group Instruction. (New York University, 1963.) Dis. Abst. 24: 3227-3228; Jan. 1964. (c-23)

No significant differences were found between groups who had individualized or traditional instruction.

(I) individualized or traditional instruction. (D) achievement; attitude; social acceptance.

e; Q 3.4; 2-s; 4 classes (112 students); 3.2, 3.5; gr. 10; 1 yr.;

---.

Greitzer, Samuel Louis. A Comparison of the Postulational Approach and the Traditional Approach in Teaching Selected Topics in Algebra to Above-Average Students. (Yeshiva University, 1959.) Dis. Abst. 21: 1137-1138; Nov. 1960. (c-22)

No significant differences in mastery of content were found between students who had 24 lessons developed by postulates of group and field theory and students who did not have these lessons in their course.

(I) use of modern postulational or traditional inductive approach. (D) achievement scores.

e; 3.27; 2-s, 3-m; 110 students; ---; gr. 11, 1 semester; non-norm.

Hanson, Lawrence Eugene. Inductive Discovery Learning, Reception Learning, and Formal Verbalization of Mathematical Concepts. (The Florida State University, 1967.) Dis. Abst. 28A: 1731-1732; Nov. 1967. (d-5)

No significant differences were found between eighth-grade groups taught by verbalized discovery, non-verbalized discovery, or reception methods. Differences favored the discovery method at the college level.

(I) type of method. (D) achievement; retention; transfer.

e; 3.8 r; 2-s, 3-s; 211 students; ---; gr. 8, college; retention

after 2 wks.; ---.

Houston, Thomas Andrew. The Relationship of Attitude and Achievement Scores to Sex, Intelligence, and Grade Level of a Selected Group of Junior High School Pupils. (Wayne State University, 1968.) Dis. Abst. 29A: 3325; Apr. 1969. (a-7, e-6, e-7, f-2b)

IQ and sex have a significant relationship to performance in arithmetic computation for pupils who were previously enrolled in a compensatory education program in inner city schools.

(I) compensatory or regular program. (D) achievement; attitude.

f; ---; 2-s, 3-m; 240 students; 3.2; grs. 7, 8; ---; norm, non-norm.

Howitz, Thomas Allen. The Discovery Approach: A Study of Its Relative Effectiveness in Mathematics. (University of Minnesota, 1965.) Dis. Abst. 26: 7178-7179; June 1966. (c-21, e-6)

No significant difference in achievement was found between groups using guided discovery or expository methods on a standardized test, but the guided discovery group scored significantly higher on a non-standardized test. No significant differences in attitude were found, nor was the relationship between achievement or ability and attitude significant.

(I) use of guided discovery or expository methods. (D) achievement; attitude.

e; 3.4; 2-s, 3-r; 12 classes (290 students); 3.2, 3.5, 6.4; gr. 9;

1 school yr.; norm, non-norm.

Teaching approaches (a-4)

Johnson, David Carlton. Programed Learning: A Comparison of the School Mathematics Study Group Programed and Conventional Textbooks in Elementary Algebra. (University of Minnesota, 1965.) Dis. Abst. 26: 5294; Mar. 1966. (c-22, d-5, d-9)

Use of the conventional SMSG textbook generally resulted in higher achievement than use of the programmed textbook.

(I) use of programmed or conventional text; IQ. (D) achievement.

e; 3.4; 1-only; 21 classes (647 students); 3.3, 6.2; gr. 9; 1 yr.;

norm.

Joseph, Dorris George. The Effects of a Specially Planned Mathematics Program on Pupil Achievement in Eighth Grade Mathematics. (Louisiana State University, 1963.) Dis. Abst. 24: 5084; June 1964.

The traditionally taught group achieved higher scores than the group which was also taught some modern content.

(I) traditional or traditional-plus-modern program. (D) achievement.

e; 3.4; 2-s, 3-s; 12 schools; 3.2, 3.3; gr. 8; 7 mos.; norm.

Kellogg, Theodore E. The Relative Effects of Variations in Pure and Physical Approaches to the Teaching of Euclidean Geometry on Pupils' Problem Solving Ability. (University of Minnesota, 1956.) Dis. Abst. 16: 2404-2405; Dec. 1956. (a-5b, c-23)

No significant differences were found on tests of factual information or problem solving ability among groups taught by induction, deduction, or application. The inductive group achieved poorest on specified specific tests.

(I) inductive, deductive, or application approach. (D) problem solving ability; attitude; retention.

e; 3.12 r; 2-s, 3-r; 55 students; 3.2, 3.5, 3.13; gr. 10; 104 days;

norm, non-norm.

Kleckner, Lester Gerald. An Experimental Study of Discovery Type Teaching Strategies with Low Achievers in Basic Mathematics I. (The Pennsylvania State University, 1968.) Dis. Abst. 30A: 1075-1076; Sept. 1969. (d-3, e-2a)

The non-discovery classes of slow learners achieved significantly more than classes taught by discovery-type strategies in a mathematics laboratory setting. Attitude changes were also more positive for the non-discovery group.

(I) discovery or conventional strategies. (D) achievement; attitude.

e; 3.4; 2-s, 3-s; 127 students; 2.6, 3.2, 3.5; grs. 9, 10; ---;

norm, non-norm.

Koppenhaver, Chester Vincent. A Comparative Study of the Effectiveness of the 'Nature and Proof' and a Conventional Method of Teaching Plane Geometry. (Temple University, 1943.) (c-13, c-23)

Lackner, Lois Marie. The Teaching of the Limit and Derivative Concepts in Beginning Calculus by Combinations of Inductive and Deductive Approaches. (University of Illinois, 1968.) Dis. Abst. 29A: 2150-2151; Jan. 1969. (c-17, c-25, d-5)

In teaching the derivative concept and the limit and derivative concepts together, the deductive approach was superior.

(I) inductive or deductive approach; limit or derivative concepts. (D) achievement.

e; 3.3; 2-s, 3-r; 400 students; 3.5, 6.2, 6.4; grs. 11, 12; 1

semester; non-norm.

Maricle, William O. A Follow-Up Study of an Experimental Seventh-Grade Mathematics Program. (University of Colorado, 1969.) Dis. Abst. 31B: 1403-1404; Sept. 1970. (c-2, c-3)

The experimental program involving in-depth study of mathematical relationships and understandings as they pertain to the algorithms of the fundamental operations was generally successful, especially for high ability students. During the senior high school, the experimental group pursued more mathematics courses and achieved as well as the conventionally-taught group.

Teaching approaches (a-4)

(I) modern or traditional program. (D) achievement.

e; 3.4; 2-s, 3-s, ---; 3.5; grs. 7-14; 8 yrs.; norm.

Maynard, Freddy Joseph. A Comparison of Three Methods of Teaching Selected Content in Eighth and Ninth Grade General Mathematics Courses. (University of Georgia, 1969.) Dis. Abst. 30A: 5347; June 1970. (c-21)

Significant differences between "discovery", "guided discovery", and expository methods were found only for girls; the "discovery" method was inferior to the other two, for units on formulas, graphs and patterns, and geometry.

(I) discovery (individual, non-verbal), guided discovery or expository methods; general mathematics achievement; mental ability; prior achievement; grade; sex of student and teacher.
(D) achievement difference scores; retention.

e; 3.15 r; 2-s, 3-r; 18 classes; 3.5; grs. 8, 9; 6 wks. (retention, 6 wks.); non-norm.

McLaughlin, John Paul. Mathematics Achievement in Relation to Textbook Communication Style and Ability Group Membership: A Comparison of Two Seventh Grade Mathematics Textbooks. (The University of Texas at Austin, 1969.) Dis. Abst. 30A: 2911; Jan. 1970. (d-1, f-2b)

For middle and upper ability students, use of a textbook which includes more discussions, symbolic notation, and explanatory material enhanced achievement on modern topics.

(I) two textbook styles; ability. (D) achievement.

e; 3.4; 1-only; 2 classes; 3.5; gr. 7; ---; non-norm.

Neuhouser, David Lee. A Comparison of Three Methods of Teaching a Programed Unit on Exponents to Eighth Grade Students. (The Florida State University, 1964.) Dis. Abst. 25: 5027; Mar. 1965. (c-14, d-5)

Students who used a discovery program with no verbalization of rules scored significantly higher on tests of understanding, transfer and retention.

(I) expository or discovery methods with verbalization or nonverbalization of rules. (D) achievement; time; transfer; retention.

e; 2.4 r; 2-s, 3-r; 117 students; ---; gr. 8; ---; ---.

Nichols, Eugene Douglas. Comparison of Two Approaches to the Teaching of Selected Topics in Plane Geometry. (University of Illinois, 1956.) Dis. Abst. 16: 2106-2107; Nov. 1956. (c-23)

No significant differences were found between groups taught by inductive or deductive approaches.

(I) inductive (structured search) or deductive (dependence) approach. (D) achievement.

e; 3.4; 2-s, 3-m; 2 classes (42 students); 3.2, 3.5; gr. 9; ---; ---.

Palzere, Donald Edward. An Analysis of the Effects of Verbalization and Nonverbalization in the Learning of Mathematics. (The University of Connecticut, 1967.) Dis. Abst. 28A: 3034-3035; Feb. 1968. (a-5b)

No significant difference was found between problem solving ability of students and ability to verbalize concepts.

a; ---; ---; ---; 1.4, 3.2; sec.; ---; ---.

Patterson, William Henry, Jr. The Development and Testing of a Discovery Strategy in Mathematics Involving the Field Axioms. (The Florida State University, 1969.) Dis. Abst. 30B: 5599; June 1970. (c-13, d-5)

No significant differences were found between groups who used "discovery" or "expository" materials on deductive reasoning and the construction of proofs.

(I) expository or discovery strategy. (D) achievement; transfer.

e; 3.8; 1-only; 2 classes; 3.4; sec.; ---; non-norm.

Teaching approaches (a-4)

Payne, Holland Ivan. A Study of Student Achievement Using SMSG and Conventional Approaches in First Year Algebra. (Oklahoma State University, 1963.) Dis. Abst. 25: 4481; Feb. 1965. (c-22, d-9)

No significant differences in achievement were found between students using SMSG or conventional materials. Students of average and high intelligence scored higher when using SMSG materials.

(I) SMSG or conventional algebra programs. (D) achievement.

f; ---; 2-s, 3-m; 474 students; 3.2; gr. 9; 1 yr.; norm.

Peterson, John Milo. A Comparison of Achievement in Traditional Mathematics Skills of Seventh Grade Students Using Three Different Types of Materials - Traditional, Transitional, and Modern. (Utah State University, 1966.) Dis. Abst. 27B: 2790-2791; Feb. 1967.

Students using traditional materials achieved significantly lower in mechanical skills than did students using modern or transitional materials, while in application of skills, those using transitional materials achieved the lowest scores.

(I) use of modern, transitional, or traditional materials; IQ.
(D) achievement of definitions and terminology of traditional mathematics, mechanical skills, and applications.

e; 3.8; 1-only; 934 students; 3.5; gr. 7; ---; norm.

Price, Jack Stanley. Discovery: Its Effect on the Achievement and Critical Thinking Abilities of Tenth Grade General Mathematics Students. (Wayne State University, 1965.) Dis. Abst. 26: 5304-5305; Mar. 1966. (c-21, g-4)

The groups using discovery lessons showed no significant gain in achievement over the group using deductive textbooks, but were better in reasoning and attitude. The group using transfer materials also showed a significant increase in critical thinking ability.

(I) use of deductive textbook, discovery lessons, or discovery plus transfer lessons. (D) achievement; attitude; reasoning; critical thinking scores.

e; 3.3; 2-s, 3-r; 3 classes (63 students); ---; gr. 10; 15 wks.;

norm, non-norm.

Rappaport, David. An Investigation of the Degree of Understanding of Meanings in Arithmetic of Pupils in Selected Elementary Schools. (Northwestern University, 1957.) Dis. Abst. 18: 1322-1323; Apr. 1958. (f-1a)

Three-fourths of the students achieved less than 50 per cent on the test of meanings. Computational skill was not an indication of understanding of the meanings of the processes used in the computation.

s; ---; 1-only; 381 students; 1.4, 6.4; grs. 7, 8; ---; norm, non-norm.

Roughead, William George, Jr. A Clarification of Part of the Discovery Versus Exposition Discussion in Mathematics. (The Florida State University, 1966.) Dis. Abst. 27A: 2452-2453; Feb. 1967. (d-5)

In an attempt to ascertain the effects of three strategies (rule and example, guided discovery, and discovery), seventh and eighth graders failed to meet the proficiency criterion. A further study with a college population did produce significant findings.

(I) rule, discovery or guided discovery strategy. (D) transfer.

e; 3.8; 1-only; 177 students; ---; grs. 7, 8, college; ---; ---.

Schippert, Frederick Arthur. A Comparative Study of Two Methods of Arithmetic Instruction in an Inner-City Junior High School. (Wayne State University, 1964.) Dis. Abst. 25: 5162-5163; Mar. 1965. (d-3, d-9)

Use of a laboratory approach in which pupils manipulated actual models or representations of mathematical principles resulted in significantly higher achievement than for pupils taught with verbal or written descriptions of those principles.

(I) two discovery approaches (verbal, manipulative). (D) achievement; attitude.

e; 3.4 r; 2-s, 3-s; 4 classes; 3.2, gr. 7; 5 mos. (retention, 2 1/2 yrs.); norm, non-norm.

Teaching approaches (a-4)

Shuff, Robert Vance. A Comparative Study of Achievement in Mathematics at the 7th and 8th Grade Levels Under Two Approaches, School Mathematics Study Group and Traditional. (University of Minnesota, 1962.) Dis. Abst. 23: 558-559; Aug. 1962. (d-9)

Generally, students using SMSG materials made greater gains than those using traditional materials, though no significant differences were found except for ability level.

(I) SMSG or traditional materials; ability level. (D) achievement.

e; 3.8; 2-s, 3-r; 388 students; 3.2, 3.4; grs. 7, 8; 1 yr.; norm.

Simmons, Sadie Vee. A Study of Two Methods of Teaching Mathematics in Grades Five, Six, and Seven. (University of Georgia, 1965.) Dis. Abst. 26: 6566-6567; May 1966. (e-6, f-2b)

Students receiving instruction under a program of modern math scored higher than those instructed under a traditional program, when achievement was measured by standardized tests designed to determine traditional achievement.

(I) modern or traditional program; ability. (D) achievement.

f; ---; 2-s; 922 students; 3.2, 3.4, 3.20; grs. 5-7; ---; norm.

Sipser, Kenneth. Determinants in the High School Mathematics Program: A Comparison of the Relative Effectiveness of Two Methods of Teaching Certain Topics to Students of Tenth Year Mathematics. (New York University, 1965.) Dis. Abst. 27B: 551; Aug. 1966. (c-26)

Significant differences in algebra, geometry, and trigonometry achievement favored the group that was taught by a determinant approach instead of by a traditional approach.

(I) determinant or traditional approach. (D) achievement in algebra, geometry and trigonometry.

e; 3.4; 2-s, 3-s; 125 students; 3.5; gr. 10; 6 wks.; norm, non-norm.

Sobel, Max A. A Comparison of Two Methods of Teaching Certain Topics in Ninth Grade Algebra. (Columbia University, 1954.) Dis. Abst. 14: 1647; Oct. 1954. (c-22)

A significant difference favoring high IQ groups taught by the concrete, inductive method was found on both immediate and retention tests on concepts and skills, but no real differences were found for average IQ groups.

(I) abstract, verbalized, deductive or concrete, non-verbalized inductive method. (D) achievement; retention.

e; 3.8 r; 2-s, 3-s; 14 classes; 3.2; gr. 9; 4 wks. (retention, 3 mos.); ---.

Strickland, James Fisher, Jr. A Comparison of Three Methods of Teaching Selected Content in General Mathematics. (University of Georgia, 1968.) Dis. Abst. 29A: 4392; June 1969. (c-21)

No significant differences were found between "discovery", "guided discovery", and expository methods for students average and low in achievement and IQ.

(I) discovery, teacher-student development, or expository strategy. (D) achievement; retention.

e; 3.11 r; 2-s, 3-r; 18 classes; 3.2, grs. 8, 9; 2 wks. (retention, 5 wks.); norm, non-norm.

Syer, Henry W. Pupil-Centered Methods of Teaching Mathematics. (Harvard University, 1950.)

Tener, Morton. Teaching Business Mathematics by Differentiated Methodologies. (Temple University, 1968.) Dis. Abst. 30A: 1087; Sept. 1969. (c-26)

Computationally oriented students tended to do better on computational posttests; all methods had similar effectiveness in increasing verbal posttest scores.

(I) verbal, computational, or combination techniques. (D) verbal problem-solving ability.

Teaching approaches (a-4)

e; 3.8; 1-only; 72 students; 1.1, 1.3, 1.8, 3.2, 3.15; sec.; 4 mos.; ---.

Tobey, William Sylvester. An Experimental Study to Determine the Relative Value of Two Methods of Teaching Mathematics on the Tenth Grade Level. (New York University, 1943.)

Volchansky, Paul Robert. The Effects of Two Mathematical Instruction Approaches on Analytical Cognition. (The University of New Mexico, 1968.) Dis. Abst. 29A: 4396; June 1969. (g-4)

Students taught by the discovery method did significantly better in answering questions of an analytical nature than did those having an expository approach. The high ability group was significantly better than the low ability group using either method.

(I) discovery or expository approach. (D) analytical achievement.

e; 3.4; 1-only; 56 students; 3.2, 3.5; gr. 8; ---; non-norm.

Wells, David Wayne. The Relative Effectiveness of Teaching First Year Algebra by Television-Correspondence Study and Teaching First Year Algebra by Conventional Methods. (The University of Nebraska Teachers College, 1959.) Dis. Abst. 20: 3137; Feb. 1960. (c-22, d-4)

No significant differences were found between groups instructed by television and correspondence study and those taught by conventional methods.

(I) use of television-correspondence study or conventional instruction. (D) achievement.

e; 3.4; 2-s; 193 students; ---; gr. 9; 1 yr.; norm.

Wilson, James William. Generality of Heuristics as an Instructional Variable. (Stanford University, 1967.) Dis. Abst. 28A: 2575; Jan. 1968. (a-5b)

For training tasks, problem solving performance tended to be independent of the level of generality of heuristics. For transfer tasks, two types of interaction were found. Students appear to benefit from having a wide range of heuristics available.

(I) level of heuristics. (D) achievement; transfer.

e; 2.8; 2-s, 3-r; 144 students; ---; gr. 10; ---; non-norm.

Wolfe, Martin Sylvester. Effects of Expository Instruction in Mathematics on Students Accustomed to Discovery Methods. (University of Illinois, 1963.) Dis. Abst. 24: 206-207; July 1963. (c-22, d-5, d-9)

No significant differences were found between groups who used expository or discovery-oriented programmed materials after a year in a discovery-oriented program (UICSM).

(I) expository or discovery instruction after discovery instruction. (D) achievement; transfer.

e; 3.8; 2-s, 3-s; 300 students; 3.2; grs. 9, 10; ---; non-norm.

Wright, Robert Earl. A Comparison of Student Achievement in Modern Mathematics and Traditional Mathematics in Relation to Ability Grouping. (Arizona State University, 1965.) Dis. Abst. 26: 3178; Dec. 1965. (e-4)

Students having modern programs achieved significantly more on a modern test than those having a traditional program; no significant differences were found on a traditional test.

(I) modern or traditional programs; ability. (D) achievement.

e; 3.12; 2-s, 3-s; ---; 3.2, 3.3; gr. 8; 18 wks.; norm.

Yasui, Roy Yoshio. An Analysis of Algebraic Achievement and Mathematical Attitude Between the Modern and Traditional Mathematics Programs in the Senior High School: A Longitudinal Study. (University of Oregon, 1967.) Dis. Abst. 28A: 4967-4968; June 1968.

The achievement of students using modern programs was significantly higher than that of those using traditional programs on test items both programs had in common. No significant differences in attitude were found.

(I) modern or traditional program. (D) achievement; attitude.

Teaching approaches (a-4)

f; ---; 2-s; 266 students; 3.2, 3.4, 3.5, 6.4; grs. 10-12; ---; norm.

Zant, James Howard. The Teaching Plan for the Unit of Work in Junior High School Mathematics. (Teachers College, Columbia University, 1933.)

Other References

Baughman, 1968	(g-4)
Brown, J. A., 1957	(b-4)
Bruni, 1968	(a-7)
Cech, 1970	(d-3)
Fejfar, 1964	(d-5)
Friebel, 1965	(c-8)
Geddes, 1962	(d-4)
Heinke, 1958	(c-30)
Hirschi, 1957	(c-22)
Horne, 1967	(a-7)
Hunter, 1951	(e-4)
Krause, 1969	(a-1)
Nelson, 1932	(a-1)
Phelps, 1964	(a-6)
Robinson, 1964	(c-13)
Rollins, 1966	(g-3)
Schaaf, 1959	(g-2)
Sederberg, 1964	(e-2b)
Snyder, 1967	(e-4)
Williams, 1962	(d-9)
Wolfe, R. E., 1969	(t-2d)
Woodall, 1967	(d-9)
Zahn, 1966	(b-6)

Shaw, Carl Neil. Effects of Three Instructional Strategems on Achievement in a Remedial Arithmetic Program. (The Florida State University, 1968.) Dis. Abst. 29A: 1479-1480; Nov. 1968. (ERIC Document No. ED 028 928) (d-6a, e-2, g-6a)

Three drill strategies, which varied on immediacy of feedback, all resulted in significant gain scores. All, including a control group, had significantly higher scores on the retention test.

(I) drill with or without feedback or mixed. (D) achievement; retention.

e; 3.4 r; 2-s; ---; ---; grs. 7-9; ---; non-norm.

Other Reference

Griffith, 1949 (e-1b)

Problem solving (a-5b)

Alexander, Vincent Eugene. The Relationship of Selected Factors to the Ability to Solve Problems in Arithmetic. (University of Southern California, 1959.) Dis. Abst. 20: 1221; Oct. 1959.

Ability to understand verbal concepts, reading comprehension and vocabulary, arithmetic concepts and computation, intelligence, reasoning ability, ability to analyze problems and specified skills involving data appeared closely related to arithmetic reasoning. Going beyond the data and crude errors in interpreting data were associated with low achievement.

r; ---; 2-s; 623 students; 2.6, 3.4, 6.3, 6.4; gr. 7; ---; ---.

Alston, Melvin O. Vitalizing Verbal Problem Material; A Manual for Use in Analyzing, Selecting, Teaching, and Appraising Verbal Problem Materials in Ninth Grade Algebra. (Columbia University, 1944.) (c-22)

Bechtold, Charles August. The Use of Extraneous Material in Developing Problem-Solving Ability of Pupils in Algebra I. (Columbia University, 1965.) Dis. Abst. 26: 3105; Dec. 1965. (c-22)

Instruction on solving problems with extraneous data resulted in better problem solving scores than did instruction with problems having no extraneous data.

(I) problems with or without extraneous data. (D) problem solving ability.

e; 3.4; 2-s, 3-s; 10 classes; 3.2; gr. 9; 3 wks.; ---.

Butler, Charles Chauncey. A Study of the Relation Between Children's Understanding of Computational Skills and Their Ability to Solve Verbal Problems in Arithmetic. (Boston University School of Education, 1956.) Dis. Abst. 16: 2400; Dec. 1956. (b-4, f-2b)

Both computing and understanding were found to be closely related to problem-solving ability, but intelligence was not.

r; ---; 2-s; 362 students; 1.6, 3.13, 6.3; grs. 7, 8; ---; non-norm.

Donahue, Robert T. An Investigation of the Factor Pattern Involved in Arithmetic Problem Solving of Eighth Grade Girls. (The Catholic University of America, 1969.) Dis. Abst. 30A: 2372; Dec. 1969.

Three factors were analyzed from a battery of tests on problem solving: a computational factor, a reading factor, and a reasoning factor.

r; ---; 1-only; 889 students; 6.1, 6.4; gr. 8; ---; non-norm.

Donohue, J. C. Factorial Comparison of Arithmetic Problem-Solving Ability of Boys and Girls in Seventh Grade. (Catholic University, 1957.)

Dwight, Leslie Alfred. Problem Solving Behaviors of Seventh Grade Pupils in Selected Schools. (George Peabody College for Teachers, 1952.)

Horsman, Ralph D. A Comparison of Methods of Teaching Verbal Problems in Arithmetic in Grades 5, 6, 7, and 8. (University of Pittsburgh, 1940.)

Kilpatrick, Jeremy. Analyzing the Solution of Word Problems in Mathematics: An Exploratory Study. (Stanford University, 1967.) Dis. Abst. 28A: 4380; May 1968. (a-6, d-9) (ERIC Document No. ED 027 182)

Measures of quantitative ability, mathematics achievement, word fluency, general reasoning, and a reflective conceptual tempo were positively correlated with using equations in solving word problems. Attitude toward mathematics was not correlated with the coded variables.

r; ---; ---; 56 students; 6.4; gr. 8; ---; ---.

Koopman, Norbert Earl. Evaluations by Superior High School Students of Their Problem Solving Performances. (The University of Wisconsin, 1964.) Dis. Abst. 25: 3398; Dec. 1964.

Boys made significantly more correct, and more incorrect, evaluations of their problem solving accuracy than did girls, who were more unsure of their solutions. The sex difference on correct evaluation diminished and incorrect evaluations increased with age, though twelfth graders made more correct and less incorrect evaluations than ninth graders.

Problem solving (a-5b)

s; ---; 2-s; 200 students; ---; grs. 9-12; ---; ---.

Martin, Mavis Doughty. Reading Comprehension, Abstract Verbal Reasoning, and Computation as Factors in Arithmetic Problem Solving. (State University of Iowa, 1963.) Dis. Abst. 24: 4547-4548; May 1964.

High correlations among reading, ability, and computation scores were found, indicating a complex interaction and the cruciality of all to problem-solving skill.

r; ---; ---; 1,107 students; 6.3, 6.4; grs. 4, 8; ---; norm.

Norman, Philip Brown. Relationships Between Problem-Solving Ability Computational Skill: Intelligence, and Amount of Training in Mathematics. (Columbia University, 1950.) Dis. Abst. 10: 156-157; Issue No. 4, 1950.

When verbal problems were presented as computational items, more students were able to answer them correctly.

s; ---; 1-only; 448 students; ---; grs. 10, 12, college; ---; non-

norm.

Post, Thomas Robert. The Effects of the Presentation of a Structure of the Problem-Solving Process Upon Problem-Solving Ability in Seventh Grade Mathematics. (Indiana University, 1967.) Dis. Abst. 28A: 4545; May 1968. (ERIC Document No. ED 028 061)

Special instruction in structure of problem solving appeared not to significantly improve problem solving ability. Intelligence was a significant factor.

(I) emphasis on structure. (D) achievement.

e; 3.1; 2-s, 3-m; 10 classes; 3.2; gr. 7; 3 days; ---.

Travers, Kenneth Joseph Dean. Forced-Choice Preferences for Problem-Solving Situations in Mathematics. (University of Illinois, 1965.) Dis. Abst. 26: 7161-7162; June 1966. (a-6)

Students preferred social-economic, mechanical-scientific, and abstract problem solving situations, in that order, with preference related to measured interests.

(I) type of school; achievement level. (D) preference.

f; ---; 2-r; 240 boys; ---; gr. 9; ---; non-norm.

Welker, Latney Conrad, Jr. A Study of Interrelationships in Arithmetical Problem Solving. (University of Southern Mississippi, 1962.) Dis. Abst. 23: 3750-3751; Apr. 1963.

Students' ability to select procedures for solving non-numerical problems was not as great as the ability to solve similar numerical problems. Their ability to solve numerical problems was not as great as their ability to perform the needed calculations.

s; ---; 1-only; 831 students; 1.4, 1.5, 1.6, 3.15; grs. 7-9; ---;

non-norm.

Other References

Ashton, 1962	(a-4)
Baughman, 1968	(g-4)
Brand, 1952	(f-1b)
Carter, 1957	(b-3)
Denmark, 1965	(a-4)
Hoffman, 1960	(g-2)
Kellogg, 1956	(a-4)
Lyda, 1943	(a-2)
Miller, 1959	(c-22)
Palzere, 1968	(a-4)
Sekyra, 1969	(d-4)
Treffinger, 1969	(d-5)
Wilson, 1968	(a-4)

Estimation (a-5c)

[No dissertations were assigned to this category.]

Brown, Betty Irene. A Study in Mental Arithmetic: Proficiency and Thought Processes of Pupils Solving Subtraction Examples. (University of Pittsburgh, 1957.) Dis. Abst. 17: 2219; Oct. 1957. (c-3b, e-2a, e-3a)

Oral, written, and flashcard presentation of test items resulted in differing achievement, but gain was relatively small after grade 8. The decomposition method was most commonly used.

(I) three testing procedures. (D) achievement.

e; 3.16; 2-s, 3-s; 1,400 students; 1.6, 6.4; grs. 6-12; ---; non-norm.

Homework and supervised study (a-5e)

Brinke, Dirk Pieter Ten. Homework: An Experimental Evaluation of the Effect on Achievement in Mathematics in Grades Seven and Eight. (University of Minnesota, 1964.) Dis. Abst. 27A: 4176; June 1967.

Significant superior achievement relative to homework in contrast to supervised study was not found for classes as a whole. There was an indication that homework was more productive for upper-ability students while supervised study was more productive for low-ability students.

(I) homework or supervised study. (D) achievement.

e; 3.7; 2-r, 3-r; 108 students; 3.3, 3.20; grs. 7, 8; 7 mos.; non-norm.

Hudson, James Alfred. A Pilot Study of the Influence of Homework in Seventh Grade Mathematics and Attitudes Toward Homework in the Fayetteville Public Schools. (University of Arkansas, 1965.) Dis. Abst. 26: 906; Aug. 1965. (a-6)

The amount of homework assigned had no significant relationship to achievement on concepts, but may influence problem-solving scores. Reactions of children, parents, and teachers were presented.

(I) homework or no homework. (D) achievement; attitude.

e; 3.4; 1-only; ---; 1.6, 3.13; grs. 6, 7, 8, 11; ---; non-norm.

Peterson, John Charles. Effect of Exploratory Homework Exercises Upon Achievement in Eighth Grade Mathematics. (The Ohio State University, 1969.) Dis. Abst. 30A: 4339; Apr. 1970.

A group receiving exploratory homework assigned for three days prior to teaching of a topic and a group receiving mathematical puzzles unrelated to the mathematics taught each achieved better than a group receiving no homework. Those who completed at least 50 per cent of the assignments in the first group achieved more than the comparable portion of the puzzle group.

(I) homework, puzzles, or no homework. (D) achievement; retention.

e; 3.16 r; 1-only; 18 classes; 3.5, 3.20; gr. 8; 6 wks.; non-norm.

Homework and supervised study (a-5e)

Other References

Bailey, 1931	(c-22)
Marshall, 1937	(c-23)
Schuppener, 1935	(c-22)
Treacy, 1960	(a-6)

Review (a-5f)

Dean, Jerome Donovan. The Completion Review: A Quasi-Programed Procedure Experimentally Tested in the High School Mathematics Classroom. (Stanford University, 1967.) Dis. Abst. 28A: 4525; May 1968. (a-6, c-22, d-5)

No significant differences in achievement or attitude were found between groups using programmed or textbook review lessons.

(I) use of programmed review lessons or textbook review exercises.
(D) achievement; attitude.

e; 3.27; 2-s, 3-r; 9 classes (244 students); 3.5; gr. 9; 1 semester;

norm, non-norm.

Checking (a-5g)

[No dissertations were assigned to this category.]

Writing and reading numerals (a-5h)

[No dissertations were assigned to this category.]

Harding, Robert Neil. The Objectives of Mathematics Education in Secondary Schools as Perceived by Various Concerned Groups. (The University of Nebraska, 1968.) Dis. Abst. 29A: 4375-4376; June 1969. (t-2)

The ranking of objectives revealed a tendency toward uniformity of perceptions of relative importance between groups. None of the objectives consistently ranked in the upper third in importance pertained to new curricular content.

s; ---; 1-only; 1,117 persons; 1.4, 1.9; sec. students, sec. teachers, others; ---; ---.

Proctor, Charles McDavitt. An Experimental Study of the Relationship Between Certain Theoretically Postulated Elements in Classroom Learning and Student Achievement, Grade Distributions, and the Incidence of Certain Classroom Activities. (University of Maryland, 1967.) Dis. Abst. 28A: 4546; May 1968. (ERIC Document No. ED 022 683) (c-22, g-6a)

Higher student achievement was associated with use of operational objectives, but classroom activities were not affected by the objectives.

(I) use of objectives and feedback. (D) achievement.

e; 3.4; 2-s, 3-r; 20 classes (570 students); 1.9, 2.6, 3.2; gr. 9; 1 yr.; norm, non-norm.

Willets, William Madeira. New Objectives for Ninth Grade Mathematics. (Temple University, 1944.) (b-3, c-21, c-22)

Other References

Bierden, 1969	(e-4)	Smith, 1970	(t-2d)
Mortlock, 1970	(e-4)	Werner, 1969	(b-4)
Rafiq, 1965	(d-5)		

Attitude, self-concept, and climate (a-6)

Anttonen, Ralph George. An Examination Into the Stability of Mathematics Attitude and Its Relationship to Mathematics Achievement from Elementary to Secondary School Level. (University of Minnesota, 1967.) Dis. Abst. 28A: 3011-3012; Feb. 1968. (t-1a)

A questionnaire to measure mathematics attitude was developed. No significant relationship was found between attitude scores and mathematics achievement from elementary through secondary school.

s; ---; 1-only; 607 students; 6.4; grs. 5-12; ---; ---.

Birr, Donald James. The Effects of Treatments by Parents and Teachers on the Self-Concept of Ability Held by Underachieving Early Adolescent Pupils. (Michigan State University, 1969.) Dis. Abst. 30A: 1354; Oct. 1969. (f-3, f-4)

No significant differences in self-concept were found between groups in which this factor was stressed to parents or teachers. There was no significant association in any group between self-concept and grade point average, but a significant correlation was found between the child's self-concept of ability and the parents' perception of the child's ability.

(I) emphasis on self-concept development. (D) grade-point average.

e; 3.15; 2-r, 3-r; 90 students; 2.6, 3.5, 5.2; grs. 7, 8; 7 mos.;

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Davis, Charles Edward. The Association of Subject Preference with Accomplishment in Selected Scholastic Areas of Eighth Grade Pupils. (University of Pittsburgh, 1956.) Dis. Abst. 16: 1225-1226; July 1956.

Relative subject preference was significantly related (.30) to achievement in mathematics, while MA and achievement were also strongly related (.66).

r; ---; 2-s; 320 students; 6.3, 6.4; gr. 8; ---; norm, non-norm.

Eldridge, Henry Madison. A Study of the Variation in Accomplishment and Subject Preference in Different Secondary Schools. (University of Pittsburgh, 1956.) Dis. Abst. 16: 1226; July 1956.

Relative subject preference varied in the six schools surveyed; mathematics was given highest preference by two and lowest preference by three.

s; ---; 1-only; 1,087 students; 1.6; grs. 11, 12; ---; norm, non-norm.

Ellingson, James B. Evaluation of Attitudes of High School Students Toward Mathematics. (University of Oregon, 1962.) Dis. Abst. 23: 1604; Nov. 1962. (f-1a)

An attitude inventory was developed and found to correlate significantly with teacher ratings of student attitudes and with achievement test scores.

r; ---; 1-only; 755 students (31 classes); 6.4; grs. 7-12; ---; ---.

Farley, Sister Mary de Chantal. A Study of Mathematical Interests, Attitudes, and Achievements of Tenth and Eleventh Grade Students. (The University of Michigan, 1968.) Dis. Abst. 29A: 3039-3040; Mar. 1969. (f-2c)

Among the conclusions are: (1) students in grade 11 who choose to study mathematics have intellectual role preferences; (2) boys' attitudes toward mathematics are more positive than girls' attitudes.

f; ---; 1-only; 4 schools; 2.6, 3.4, 3.5, 6.2; grs. 10, 11; ---; ---.

Attitude, self-concept, and climate (a-6)

Ferderbar, Joseph E. Changes in Selected Student Attitudes and Personality Measures and Their Relationship to Achievement, Intelligence, and Rate When Using Programed Instruction. (University of Pittsburgh, 1963.) Dis. Abst. 25: 6310; May 1965. (d-5, e-5)

A definite decrease over time in the favorableness of student attitude toward use of programmed materials and toward the subject was found. Little correlation was found between attitude and IQ or achievement, but rate of progress was somewhat related to attitude.

r; ---; ---; 616 students; 6.4; grs. 7, 9; ---; ---.

Kauffman, Merle Maurer. Expressed Interests of Children in Relation to a Maturity-Age Index in Grades Four Through Eight. (Northwestern University, 1955.) Dis. Abst. 15: 2074; Nov. 1955.

Boys exhibited a growing preference for mathematics and science as they grew older, while girls preferred the language arts and social studies.

s; ---; 1-only; 2,234 students; ---; grs. 4-8; ---; ---.

Phelps, Jack. A Study Comparing Attitudes Toward Mathematics of SMSG and Traditional Elementary School Students. (Oklahoma State University, 1963.) Dis. Abst. 25: 1052; Aug. 1964. (a-4, d-9)

No significant differences were found between attitudes of eighth graders in SMSG or traditional programs, but fifth grade SMSG students had significantly higher attitudes than those in traditional programs. Higher IQ groups scored higher when using SMSG materials.

f; ---; 2-s, 3-s; 24 classes (623 students); ---; grs. 5, 8; ---;

---.

Phillips, Robert Bass, Jr. Teacher Attitude as Related to Student Attitude and Achievement in Elementary School Mathematics. (University of Virginia, 1969.) Dis. Abst. 30A: 4316-4317; Apr. 1970. (f-4)

Most-recent-teacher-attitude was significantly related to student attitude. Type of teacher attitude encountered by the student for two and for three of his past three years was significantly related to his present attitude and to his achievement.

f; ---; 2-s; 306 students, 59 teachers; 3.2; gr. 7, in-service teachers; ---; norm.

Schneider, Arthur J. An Investigation of the Relationships Between Self Concept of Ability, Achievement, and Level of Occupational Aspiration Among Ninth Grade Boys. (The University of Rochester, 1969.) Dis. Abst. 30A: 3285-3286; Feb. 1970. (f-2)

Relationships between and among self-concept of ability, achievement, and level of occupational aspiration were positive and significant across mathematics, English, social studies, and science.

r; ---; 2-s; 201 boys; 6.2, 6.4; gr. 9; ---; ---.

Spickerman, William R. A Study of the Relationships Between Attitudes Toward Mathematics and Some Selected Pupil Characteristics in a Kentucky High School. (University of Kentucky, 1965.) Dis. Abst. 30A: 2733; Jan. 1970. (f-2)

Relationships were found between attitude toward mathematics and type of curriculum, and course mark aspiration. Boys did not have more favorable attitudes than girls. In grade 9, course marks, but neither IQ nor achievement scores, were related to attitude. Low SES students tended to have less favorable attitudes toward mathematics.

r; ---; ---; 713 students; 2.6, 3.4, 6.4; grs. 8-12; ---; non-norm.

Treacy, Sister Mary Denis. The Effect of Interest-Centered "Take-Home Tests" on Learning in Elementary Algebra. (New York University, 1959.) Dis. Abst. 20: 4404; May 1960. (a-5e, c-22, f-1)

Interest-centered "take-home tests" did not have significant effect on "general efficiency" in algebra nor on problem solving ability.

(I) conventional or interest-centered tests. (D) problem solving ability; achievement.

a; 2.2; 2-m; 63 girls; ---; gr. 9; 1 semester; norm.

Attitude, self-concept, and climate (a-6)

Weise, Ingrid Bergstrom. Guidelines for a Supervisory Program Directed to Relating the Mathematics Programs of the Elementary and Junior High School. (University of Maryland, 1966.) Dis. Abst. 27A: 3686; May 1967. (b-3, t-2b)

No significant difference was found between the attitudes of sixt and seventh graders, but interests of teachers at the two levels differed. Guidelines for articulation, especially in evaluation, were developed.

s; ---; 1-only; 131 students, 158 teachers, 18 supervisors; ---;

students and in-service teachers (grs. 6, 7); ---; ---.

Other References

Anderson, 1958	(d-3)	Kilpatrick, 1968	(a-5b)
Bachman, 1969	(a-3)	Kysilka, 1970	(t-2d)
Beaton, 1967	(e-2a)	Lewis, 1969	(f-2c)
Berenberg, 1958	(e-5)	McCardle, 1959	(f-4)
Burbank, 1970	(f-3)	Nealeigh, 1968	(f-1a)
Cech, 1970	(d-3)	Osborn, 1966	(d-9)
Dean, 1968	(a-5f)	Peskin, 1966	(f-4)
Devine, 1967	(d-5)	Ray, 1961	(e-3)
Erickson, 1962	(f-1a)	Rochlin, 1952	(c-21)
Fey, 1969	(t-2d)	Stanford, 1970	(d-3)
Foust, 1969	(b-3)	Stilwell, 1968	(t-2d)
Garner, 1963	(f-4)	Todd, 1966	(t-2b)
Hernandez, 1970	(t-2d)	Travers, 1966	(a-5b)
Hill, 1970	(t-2d)	Woodall, 1967	(d-9)
Hudson, 1965	(a-5e)	Zamboni, 1969	(e-5)
Johnson, 1966	(a-7)		
Kester, 1969	(f-4)		

Abeles, Francine. College Preparatory Programs in Geometry of Four Nations: A Critique for the Study of U.S.A. Programs. (Columbia University, 1964.) Dis. Abst. 25: 4567-4568; Feb. 1965. (b-3, c-23, d-1)

In four European programs, geometry was not taught as a separate subject, transformations and vector concepts were stressed more, there was less concern with the axiomatic nature of geometry, and synthetic and analytic aspects were integrated later than in American experimental programs.

d; ---; ---; ---; ---; ---; ---; ---.

Ali, Md. Basharat. To Establish the Feasibility of Using Translated and Adapted Versions of an American-Made Mathematics Achievement Test in East Pakistan. (Colorado State College, 1964.) Dis. Abst. 28A: 115-116; July 1967. (f-1a)

Translations of Cooperative Mathematics Tests into Bengali were found to be as consistently reliable as the original version.

r; ---; 1-only; 658 students; 3.6, 3.10, 6.4; grs. 8-10; ---; norm.

Alsaqqar, Abdulhameed Mohammed. New Direction for Iraqi Intermediate School Mathematics. (Syracuse University, 1963.) Dis. Abst. 25: 3908; Jan. 1965. (d-9)

Specific directions, based on current U.S. developmental projects for reform of the Iraqi program, were indicated.

d; ---; ---; ---; ---; grs. 7-9; ---; ---.

Anderson, Robert Arnold. Mathematical Student Achievement of Third Form (Ninth Grade) Students in London and St. Paul-Minneapolis Metropolitan Areas. (University of Minnesota, 1964.) Dis. Abst. 25: 5008; Mar. 1965.

Students in the two countries did not differ significantly in ability or mathematical achievement, although differences for type of school and intelligence level were found.

f; ---; 2-r; 4,753 students; 3.2, 3.3, 3.4, 3.5; gr. 9; ---; norm.

International comparisons (a-7)

Bolser, Frank Curtis. Education in the Field of Mathematics in the USSR. (The University of Florida, 1959.) Dis. Abst. 22: 2704; Feb. 1962. (b-3)

Mathematics curricula, teaching materials and procedures, patterns of teacher education, philosophy, and trends were discussed.

d; ---; ---; ---; ---; grs. K-12; ---; ---.

Bruni, James Vincent. A Study of Mathematical Education in the Public Elementary and Secondary Schools of Italy. (Columbia University, 1967.) Dis. Abst. 28B: 3368-3369; Feb. 1968. (a-4)

Recent Italian experimentation has been similar to American in the modern mathematic content being introduced; however, the extent of experimentation has been discouraged by lack of funds, influence of the ministry of public education, and lack of concern of pedagogy.

d; ---; ---; ---; ---; grs. K-12; ---; ---.

El-Naggar, Mohamed Abu-Khalil. A Comparative Study of Mathematics Programs in Egypt and the United States (Grades 7, 8, and 9). (Indiana University, 1965.) Dis. Abst. 27A: 326-327; Aug. 1966.

Similar mathematics topics are included in both mathematics programs in the junior high school. Topics differ in the elementary school programs in both countries as a result of the introduction of modern mathematics topics at that level in the United States.

d; ---; ---; ---; ---; grs. 7-9; ---; ---.

Hannarkin, Panas. A Proposed Mathematics Program for the Comprehensive Secondary School in Thailand. (Indiana University, 1961.) Dis. Abst. 22: 815-816; Sept. 1961. (b-3)

Criteria for a mathematics program were selected, and specific sequence and content recommendations made.

d; ---; ---; ---; ---; grs. 8-12; ---; ---.

Horne, Edgar Byron. A Comparative Study of College Preparatory Mathematics Curricula in Canada in 1964-65. (University of Illinois, 1966.) Dis. Abst. 27A: 2098-2099; Jan. 1967. (a-1, a-4, b-3)

A wide divergence of mathematical background was observed in students from different provinces, with Quebec offering the strongest traditional program. Differences in content, sequence, and organization were also noticeable.

d; ---; ---; ---; ---; grs. 9-12; ---; ---.

Jacobsen, Edward Carl. Recommendations for the Implementation of a Modern Mathematics Program in Botswana. (University of Kansas, 1969.) Dis. Abst. 30A: 2419-2420; Dec. 1969.

Recommendations for use within the present system include implementation of the Entebbe Program, better use of radio as an educational tool, and improvement of in-service training.

d; ---; ---; ---; ---; grs. K-12; ---; ---.

Jahn, Harvey Raymond. The Development of Soviet Educational Policy During 1917-1936: A Case Study of Mathematics Education at the Elementary and Secondary Levels. (The University of Michigan, 1968.) Dis. Abst. 30A: 148; July 1969. (a-1, b-3)

Soviet mathematics education has retained significant amounts of Imperial Russian heritage, with ambivalences noted.

d; ---; ---; ---; ---; elem., sec.; ---; ---.

Johnson, Sonia Ann Harris. Some Selected Classroom Variables and Their Relationship to Mathematics Achievement in Central Minnesota and the Greater London Area. (Rutgers - The State University, 1966.) Dis. Abst. 27A: 139-140; July 1966. (a-6)

Intelligence, attitude, and homework were found to be most closely related to mathematics achievement. In both amount of homework and positive student attitude toward mathematics, American groups had a significantly higher mean.

r; ---; 2-r; 1,922 American and 3,336 English students, 160

in-service teachers; 6.4; sec.; ---; norm, non-norm.

International comparisons (a-7)

Vogeli, Bruce Ramon. The Mathematics Program of the Soviet Secondary School: Its Status and Innovations. (University of Michigan, 1960.) Dis. Abst. 21: 305-306; Aug. 1960. (b-3)

Syllabi, examinations, texts, and journals were used to analyze and compare Soviet curricula in 1952-3 and 1958-9. Changes appeared related to polytechnism, to desire to lighten the student's academic load, and to efforts to raise the scientific level of instruction in mathematics.

d; ---; ---; ---; ---; grs. 1-10 (Soviet); ---; ---.

Zur, Mordehai. Implications of the Recent Mathematics Reform for Grades 7-9 in the United States for the Israeli Elementary and Secondary Schools. (Columbia University, 1966.) Dis. Abst. 28A: 4436; May 1968.

Some principles of selection of content, organization and method of presentation in the United States mathematics reform are of value to mathematics education in Israel.

d; ---; ---; ---; ---; grs. 7-9; ---; ---.

Other References

Ahmad, 1970	(d-1)
Aijaz, 1963	(f-1a)
Baroya, 1967	(f-1a)
Houston, 1969	(a-4)
Jamshaid, 1969	(a-1)
Jorgensen, 1968	(b-3)
Palmer, 1968	(d-1)
Shouk, 1966	(t-1b)

Pre-first grade concepts (b-1)

[No dissertations were assigned to this category.]

Readiness (b-2)

Tucker, Joseph. A Junior High School Level Experiment on Developing Algebra Readiness by the Use of Finite Non-Numerical Algebraic Systems. (Auburn University, 1969.) Dis. Abst. 31A: 1154; Sept. 1970. (b-3, c-22, c-30, f-2c)

The experimental material contributed significantly to the confidence of students toward success in algebra. Students in the middle range of aptitude for algebra scored significantly higher on prognosis tests than did students in the control group.

(I) unit on properties of groups and fields or introductory unit on algebra in textbook. (D) algebra prognosis score.

e; 3.4; 2-s; 8 classes (2 schools); 3.2, 3.5; gr. 8; ---; ---.

Barto, Joseph Allan. The Mathematics Program in Selected Junior High Schools, 1958-1965. (The University of Nebraska Teachers College, 1966.) Dis. Abst. 27A: 3244-3245; Apr. 1967. (a-1)

Forty per cent of the schools were using experimental program materials while most others reported using "modern" textbooks.

s; ---; 2-r; 60 schools; 1.6; grs. 7-9; ---; ---.

Beninati, Albert F. A Study of Articulation Between College and High School Mathematics. (Columbia University, 1963.) Dis. Abst. 25: 317-318; July 1964. (a-1, d-9)

The influence of groups such as SMSG and UICSM and of critics of education on the mathematics curriculum is noted.

d; ---; ---; ---; ---; sec., college; ---; ---.

Brown, Jean Fleming. The Construction and Teaching of a Combined Course in Plane and Solid Geometry for the Tenth Year: An Experimental Study. (New York University, 1934.) (c-23)

Carter, William Lee. A New Basis of Organization for the Junior High School Mathematics Program. (The Ohio State University, 1952.) Dis. Abst. 17: 2521-2524; Nov. 1957. (a-2, a-5b)

A program emphasizing problem-solving skills with real-life problems was developed and tried out, with classes achieving better than norm groups.

a; ---; 1-only; 3 classes; ---; grs. 7-9; ---; norm, non-norm.

Cassidy, Walter F. The Commercial Mathematics Curriculum: A Validation of Some Basic Items. (Fordham University, 1940.)

Crawford, Matthew William. An Analysis of the Mathematics Curriculum in the Negro Public High Schools in Louisiana. (Colorado State College, 1967.) Dis. Abst. 28A: 1611-1612; Nov. 1967.

More than 50 per cent of the ninth graders were enrolled in general mathematics. All schools also offered algebra I and geometry, but few offered more advanced courses.

s; ---; 2-s; 61 schools; 1.6; grs. 9-12; ---; ---.

Diebel, Clarence Edward. Some Influences of Evaluations on the Science and Mathematics Programs in Oregon Secondary Schools. (University of Oregon, 1959.) Dis. Abst. 19: 2266-2267; Mar. 1959.

The extent to which recommendations had been implemented was analyzed. (No specifics relating to mathematics are cited.)

s; ---; ---; 57 schools; ---; sec.; ---; non-norm.

Dunson, Charles Kenneth. A Descriptive Analysis of the Mathematics Curriculum in the Predominantly Negro High Schools in the State of Georgia. (Colorado State College, 1969.) Dis. Abst. 30A: 4138-4139; Apr. 1970. (e-7)

Among other findings, it was reported that all 81 schools offered general mathematics, algebra I, and geometry; only large schools offered courses beyond trigonometry. Few had used experimental materials.

s; ---; ---; 81 schools (274 teachers); 1.6; sec.; ---; non-norm.

Foust, William Lee. Enrollment: A Curriculum Innovation Student Response Measure. (University of Oregon, 1969.) Dis. Abst. 30A: 1465-1466; Oct. 1969. (a-6, d-9)

Students in a 3+ year mathematics curriculum innovation sequence did not differ significantly in mathematics or science scores from students in other curriculum innovation sequences.

f; ---; 2-s, r; 9 schools; 2.6; gr. 12; ---; ---.

Furgele, Frank James. An Investigation of Reported Problems and Attempted Solutions Which Confronted Selected School Systems in Pennsylvania Attempting to Improve Scope and Sequence in Grades 1-12 in the Language Arts, Mathematics, Science and Social Studies Areas. (Temple University, 1965.) Dis. Abst. 26: 5127-5128; Mar. 1966.

More courses were added to the mathematics curriculum than to others. Scope and sequence, articulation, and providing for individual differences were problems reported across all subjects.

s; ---; 2-s; 90 schools; ---; grs. 1-12; ---; ---.

Hancock, John David. The Evolution of the Secondary Mathematics Curriculum: A Critique. (Stanford University, 1961.) Dis. Abst. 22: 501-502; Aug. 1961. (a-1, d-9)

Aims and recommendations from 1893 to 1961 were analyzed; they reflect prevailing societal demands. Little attention has been given to methods of instruction. Content recommendations generally cite algebra and demonstrative plane geometry for the first two years, then are more variable.

d; ---; ---; ---; ---; grs. 9-12; ---; ---.

Hanna, Joe Edwin. The Determination of the Steps That Should Be Taken in the Initiation and Development of a Modern Mathematics Curriculum in the Omaha Public Schools. (The University of Nebraska Teachers College, 1965.) Dis. Abst. 26: 5785-5786; Apr. 1966. (t-2b)

Basic steps determined in the study included involvement of teachers in the selection and development of new materials, a strong in-service education program, and constant appraisal of the staff's willingness to accept and utilize modern mathematics in their teaching.

d; ---; ---; ---; ---; grs. K-12; ---; ---.

Hatz, Van Richard. A Treatise on the Possibility of Teaching Philosophy Through "New" Mathematics on the Secondary Level. (The University of Mississippi, 1965.) Dis. Abst. 26: 5290; Mar. 1966. (c-30)

Analogous components of mathematics and philosophy are presented, with a rationale for including philosophy in the mathematics curriculum.

d; ---; ---; ---; ---; grs. 7-12; ---; ---.

Content organization
and inclusion (b-3)

Hawkinson, Lawrence Drew. The Contributions to the Secondary Mathematics Curriculum of Three Schools in the Philosophy of Mathematics. (Stanford University, 1967.) Dis. Abst. 28A: 4529-4530; May 1968. (m-1)

Logicism, Formalism, and Intuitionism were examined and related to 16 concepts in secondary school mathematics.

d; ---; ---; ---; ---; sec.; ---; ---.

Hawthorne, Robert R. Curricular Provisions in Iowa High Schools from 1954 to 1964. (The University of Iowa, 1966.) Dis. Abst. 27A: 1200-1201; Nov. 1966. (a-1)

Trigonometry and algebra II increased markedly both in offering and enrollment percentages from 1954 to 1964.

s; ---; 2-r; ---; 1.6; grs. 9-12; 10 yrs.; ---.

Irvin, Amanda L. The Organization of Instruction in Arithmetic and Basic Mathematics in Selected Secondary Schools. (University of Southern California, 1952.) (c-20, c-21)

Jorgensen, Paul Sejr. A Study of Secondary Mathematics Education in Denmark with Related Implications for Modern Secondary Mathematics Education in the United States. (The University of Wisconsin, 1968.) Dis. Abst. 29A: 409-410; Aug. 1968. (a-7)

Emphasis on rigor in American courses was questioned; teaching arithmetic, algebra, and geometry concurrently, and involving students in oral presentations and tests, were suggested.

d; ---; ---; ---; ---; sec.; ---; ---.

Kazim, Maassouma Mohamed. Basic Assumptions for a Secondary School Mathematic Program. (University of Kansas, 1964.) Dis. Abst. 26: 223-224; July 1965.

Guiding principles for the development of a mathematics program were determined.

d; ---; ---; ---; ---; sec.; ---; ---.

Kelley, Charles Edward. Trends in Secondary School Mathematics Education, 1955 to 1960. (University of Missouri, 1960.) Dis. Abst. 21: 1423-1424; Dec. 1960. (a-1)

Specific recommendations for course content made by various professional groups were synthesized.

d; ---; ---; ---; ---; grs. 9-12; ---; ---.

Kozak, Andrew V. Kalgometrics: An Experiment in the Teaching of Plane Geometry, Trigonometry, Analytic Geometry, Differential Calculus, and Integral Calculus to "Selected" Tenth-Grade Pupils in the High School. PSU 15: 340-349; 1952. (c-23, c-24, c-25, e-3)

The group studying plane geometry plus other topics scored significantly higher than groups studying only plane geometry. They also compared well with college groups on the other topics.

(I) varied topics or plane geometry only. (D) achievement.

e; 3.4; 1-only; ---; 1.10, 3.15; gr. 10, college; 1 yr.; norm.

Kriewall, Thomas Edward. Applications of Information Theory and Acceptance Sampling Principles to the Management of Mathematics Instruction. (The University of Wisconsin, 1969.) Dis. Abst. 30A: 5344; June 1970. (e-4)

The systems approach, test theory, and the development of computer-managed instruction are analyzed as needed components of programs featuring self-selection and self-pacing.

d; ---; ---; ---; ---; grs. K-12; ---; ---.

McClimans, J. Wilmot. Functional Units of Instruction in Senior Mathematics. (George Peabody College for Teachers, 1940.)

McKinney, Max Terral. A Study of the Teaching and Use of the New Program Material in Mathematics in Selected Secondary Schools in Alabama. (Auburn University, 1964.) Dis. Abst. 25: 5155-5156; Mar. 1965. (d-9)

Students and teachers had favorable attitudes toward the new material which they were using (in Alabama).

s; ---; 2-s; 46 teachers, 1,007 students; 1.7; grs. 9-12; ---; non-norm.

McLean, Robert Clay, Jr. The Establishment of Integrated Algebra-Geometry Courses in the Secondary Schools of California. (University of Southern California, 1960.) Dis. Abst. 21: 135-136; July 1960. (c-22, c-23)

Only 23 schools (in California) offered integrated algebra-geometry courses. Colleges were willing to accept such courses for non-science majors.

s; ---; 2-s; ---; ---; grs. 7-12; ---; non-norm.

Merfeld, Matt. A Rationale for the Development of a Tenth Grade Linear Algebra Course. (Rutgers - The State University, 1968.) Dis. Abst. 29A: 2042; Jan. 1969. (c-22)

A unit on vectors, representing a unified introduction to linear algebra, was generally favorably received by students and teachers.

a; ---; 1-only; 106 students; ---; grs. 9, 10; 6 wks.; non-norm.

Montgomery, Warren Guy. An Analysis and Appraisal of the Sioux City, Iowa, Secondary School Accelerated Mathematics Program. (University of South Dakota, 1968.) Dis. Abst. 29A: 2489-2490; Feb. 1969. (c-26)

Students in the advanced program scored higher than those in the regular program.

(I) advanced or regular program. (D) achievement.

f; ---; 2-s, 3-m; ---; 1.10, 3.24; grs. 8-12; ---; norm.

Nielson, Ross Allan. Mathematics Instruction in Iowa High Schools. (State University of Iowa, 1955.) Dis. Abst. 15: 2490; Dec. 1955. (a-1)

The percentage of students in mathematics decreased six per cent between 1934 and 1955, although the number enrolled increased 15 per cent. Most classes used a single textbook and expository strategies.

s; ---; 2-r; 155 teachers; 1.6; in-service teachers (grs. 9-12);

---; ---.

Olsen, Glenn William. The Development and Analysis of a Hierarchy of Learning Tasks Involved in the Concept of Slope. (Cornell University, 1968.) Dis. Abst. 29A: 4334; June 1969. (c-17, t-1a)

Rationally-developed hierarchies were tested, with a relatively high level of consistency across grade and ability levels found.

s; ---; 1-only; 569 students; ---; grs. 5-9; ---; non-norm.

Pang, Morris Soo Young. An Analysis of a Structure of Mathematics Directed Toward a Reflective Procedure for Learning Mathematics. (Colorado State College, 1968.) Dis. Abst. 29A: 1168-1169; Oct. 1968. (d-9)

Greater emphasis on creativity and reflective thought rather than on understanding in mathematics was suggested.

d; ---; ---; ---; ---; sec.; ---; ---.

Purvis, Colbert Thaxton. Cooperatively Developed Criteria for High School Mathematics Programs. (George Peabody College for Teachers, 1957.) Dis. Abst. 18: 601; Feb. 1958.

The instrument was considered plausible for use by a school in evaluating its mathematics program or by a teacher to study his courses and teaching. Findings from its use in Georgia were cited.

s; ---; ---; 215 educators, 85 schools; ---; ---; ---; ---.

Riggle, Timothy Andrew. The Vector Space as a Unifying Concept in School Mathematics. (The Ohio State University, 1968.) Dis. Abst. 29B: 1764-1765; Nov. 1968. (c-30)

Opportunities for studying vectors at many levels are cited.

d; ---; ---; ---; ---; grs. K-12; ---; ---.

Content organization
and inclusion (b-3)

Rudnick, Jesse A. A Study of the College Preparatory Mathematics Curriculum of Public Secondary Schools in Selected Cities of the United States in the Academic Years 1957-58 and 1960-61. (Temple University, 1962.) Dis. Abst. 23: 3820; Apr. 1962. (a-1, d-9)

Trends such as the increased offering of algebra in grade 8, former college-level courses, and new topics were noted.

s; ---; 1-only; ---; 1.6; grs. 7-12; ---; ---.

Rust, Richard George. The Effects of Studying Certain Mathematics Courses on Mathematical Competency in Selected Michigan High Schools. (The University of Michigan, 1964.) Dis. Abst. 25: 7030-7031; June 1965. (b-6)

Few significant differences in proficiency or attitude were found for students who had various course sequences for one to three years.

r; ---; 1-only; 1,351 students; 6.4, grs. 9-11; ---; non-norm.

Shetler, Luther Leroy. Practices and Trends in the Teaching of Secondary School Mathematics. (Indiana University, 1958.) Dis. Abst. 19: 2033; Feb. 1959.

General agreement was found between opinions of authorities and practices in use.

s; ---; 2-r; ---; ---; grs. 9-12; ---; ---.

Sooy, John Milton. An Analysis of the Relationship Between the Recommendations of the College Entrance Examination Board and the Algebra Topics Taught in the New Jersey Secondary Schools and Appearing in Their Textbooks. (Temple University, 1969.) Dis. Abst. 31A: 1152; Sept. 1970. (c-22, d-1)

Most recommended new topics are being included in Algebra I and II textbooks and by teachers in their teaching, except for topics in trigonometry.

s; ---; 1-only; 764 teachers, 31 textbooks; ---; in-service

teachers (grs. 9, 11); ---; ---.

Stabler, Edward Russell. The Educational Possibilities of Geometry: A Theoretical Study Evaluating the High School Course in the Subject and Suggesting a Tentative Plan of Reorganization. (Howard University, 1935.) (c-23)

Stalzer, Elsie June. Contributions of Mathematics to a Proposal for Reorganizing General Education in Secondary Schools on the Basis of a Core Program. (The Ohio State University, 1952.) Dis. Abst. 18: 968-970; Mar. 1958.

The role of mathematical topics in "core"-type general education programs was analyzed and found to be significant.

d; ---; ---; ---; ---; grs. 9-12; ---; ---.

Steinbrenner, Arthur Henry. A Study of the Concept of Continuity for Teachers of Secondary Mathematics. (Columbia University, 1955.) Dis. Abst. 15: 2137-2138; Nov. 1955. (c-22, c-23, c-30, t-1b_

The history of the concept of continuity and suggestions for including it in the secondary school curriculum were made.

d; ---; ---; ---; ---; ---; ---; ---.

Truax, Robert Lloyd. A Study of Factors Which Influence Curriculum Change in Secondary School Mathematics. (Oklahoma State University, 1964.) Dis. Abst. 26: 1438; Sept. 1965.

Schools with modern programs were spending more money per pupil and had more teachers who belonged to professional organizations, attended workshops, and did professional reading.

s; ---; 1-only; ---; ---; sec.; ---; ---.

Wagner, John, Jr. Some Aspects of Modern Mathematics. (The University of Texas, 1960.) Dis. Abst. 21: 1810-1811; Jan. 1961.

A survey of mathematical literature and interviews with prominent mathematicians revealed the constant development of new topics and reorganization, extension, and transforming of older content. Implications of specific developments for the pre-college curriculum were delineated.

s; ---; ---; 27 mathematicians; ---; sec.; ---; ---.

Content organization
and inclusion (b-3)

Wahlstrom, Lawrence F. The Status of the Teaching of High School Mathematics in the State of Wisconsin. (University of Wisconsin, 1951.)

Wales, Lois Tyler. A Recommended Program for High School General Mathematics as Determined by an Appraisal of Present Content and Placement of Subject Matter. (Louisiana State University, 1958.) Dis. Abst. 19: 745-746; Oct. 1958.

Ratings of topics included in textbooks were used to determine a recommended general mathematics program for each high school year.

d; ---; ---; ---; ---; ---; ---; ---.

Wright, James Thomas Carr. The Function of Mathematics in a State Educational Program. (George Peabody College for Teachers, 1938.)

Content organization
and inclusion (b-3)

Other References

Abeles, 1965	(a-7)
Bolser, 1962	(a-7)
Buchalter, 1969	(d-1)
Buckland, 1954	(t-1b)
Byham, 1970	(c-13)
Chavier, 1965	(t-1b)
Connellan, 1962	(t-2b)
Crespy, 1970	(d-9)
Fishman, 1966	(a-1)
Grabenheimer, 1961	(a-1)
Haenisch, 1967	(c-22)
Hall, 1970	(f-2c)
Hannarkin, 1961	(a-7)
Hatfield, 1970	(d-6b)
Higgins, 1967	(d-8)
Hodgin, 1967	(t-2c)
Hollingshead, 1966	(c-30)
Horne, 1967	(a-7)
Howard, 1969	(d-9)
Ibrahim, 1949	(a-1)
Jacobs, 1970	(c-30)
Jahn, 1969	(a-7)
Jamshaid, 1969	(a-1)
Linkhart, 1968	(c-26)
Lyda, 1943	(a-2)
Mallory, 1938	(e-2a)
Monk, 1966	(c-22)
Nicely, 1970	(d-1)
Polowy, 1958	(c-22)
Quast, 1968	(a-1)
Schaefer, 1967	(t-2d)
Schlessinger, 1958	(t-2b)
Smith, C. L., 1965	(a-2)
Smith, S. D., 1967	(t-2d)
Sparks, 1960	(f-4)
Stubblefield, 1964	(a-1)
Szabo, 1970	(c-24)
Taylor, 1970	(c-30)
Tucker, 1970	(b-2)
Usiskin, 1970	(c-23)
Vogeli, 1960	(a-7)
Weise, 1967	(a-6)
Werner, 1969	(b-4)
Whitcraft, 1932	(f-2c)
Willets, 1944	(a-5i)
Wixson, 1970	(d-8)
Woods, 1962	(t-2b)
Yasin, 1962	(a-1)

Quantitative understanding (b-4)

Brown, John Arthur. Theoretical Topics in Mathematics at the Eighth Grade Level. (University of Wisconsin, 1957.) Dis. Abst. 17: 1956; Sept. 1957. (a-4, c-2, c-4, c-5, c-13)

Materials were developed to teach the basis of numbers, an analysis of operations with rational numbers, and the idea of proof.

a; ---; 1-only; 1 class; ---; gr. 8; ---; non-norm.

Van Deventer, Lester Raymond. The Development of a Procedure for Study and Revision of the Mathematics Curriculum in Secondary Schools. (University of Illinois, 1954.) Dis. Abst. 14: 800-801; May 1954.

Three inventories and a discussion guide were prepared.

d; ---; ---; ---; ---; grs. 9-12; ---; ---.

Werner, Sister Marijane. An Application of Critical Path Analysis to the Design of a Systematically Articulated Curriculum in Science and Mathematics for Secondary Schools. (Boston College, 1968.) Dis. Abst. 29A: 4209-4210; June 1969. (a-5i, b-3)

Knowledge of PERT concepts and principles was found to aid in efficient curriculum planning.

s; ---; 1-only; 638 educators; ---; in-service teachers, authors;

---; ---.

Woodby, Lauren Gayle. A Synthesis and Evaluation of Subject-Matter Topics in Mathematics for General Education. (University of Michigan, 1952.) Dis. Abst. 12: 531; Issue No. 4, 1952. (c-26)

A list of the 1,077 topics synthesized from textbooks, courses of study, and educators was recommended as a source for curriculum workers.

d; ---; ---; ---; ---; grs. 7-14; ---; ---.

Quantitative understanding (b-4)

Other References

Alspaugh, 1966	(t-2d)
Berenson, 1961	(a-1)
Bush, 1959	(c-20)
Butler, 1956	(a-5b)
Davis, 1950	(c-20)
Glennon, 1948	(f-2)
Hodges, 1964	(g-4)
Huber, 1963	(a-1)
Osborne, 1956	(t-1b)
Smith, 1959	(c-17)
Stoneking, 1961	(t-1b)

Grade placement (b-5)

Bezdek, Jim Joseph. A Comparison of Two Approaches to the Teaching of Plane and Solid Geometry. (Cornell University, 1966.) Dis. Abst. 28A: 150-151; July 1967. (c-23)

Students in a one-year plane-solid geometry unified course achieved as well in plane geometry as those in a one-year plane geometry course or in a one and one-half year sequence of separate courses, but the latter group scored higher on solid geometry tests.

(I) usual plane geometry or unified course in tenth grade, or separate plane and solid geometry courses in grades 10 and 12.
(D) achievement.

e; 3.4; 2-s, r; 255 students; 3.3, 3.4; grs. 10, 12; 1 yr.; norm.

Other References

Burdick, 1970	(e-3b)
D'Augustine, 1964	(c-11)
Lyda, 1943	(a-2)
Sowder, 1970	(g-3)

Hansen, Viggo Peter. Elementary Algebra Achievement as Related to Class Length and Teaching Method. (University of Minnesota, 1962.) Dis. Abst. 24: 198; July 1963. (c-22, d-9)

No significant differences in achievement or attitude were found between the three groups receiving longer exposure and/or a variety of class and laboratory activities.

(I) class length; class and laboratory activities. (D) achievement; attitude.

e; 2.11; 2-s, 3-r; 74 students; 3.2, 3.4; gr. 9; 1 school yr.;

norm, non-norm.

Turano, John Peter. A Comparison of the Effectiveness of Two Distributions of Time Allotted to the Teaching of Arithmetic. COSC 17: 113-116; 1955.

Classes having arithmetic two hours per day for 10 weeks followed by a 35-minute period per week for 20 weeks achieved as well as classes having instruction for 45 minutes per day for 30 weeks.

(I) two time allotments. (D) achievement.

e; 3.4; 2-s; 4 classes (170 students); 3.2, 3.4; grs. 6, 7; 30 wks.;

norm.

Zahn, Karl George. The Optimum Ratio of Class Time To Be Allotted to Developmental Activities and To Individual Practice in Teaching Arithmetic. (University of Colorado, 1965.) Dis. Abst. 26: 6459; May 1966. (a-4)

Students in groups that spent the greatest portion of their class time on developmental activities did better in arithmetic achievement than those in sections which spent more time in practice work.

(I) 67%, 56%, 44% or 33% of class time on developmental activities. (D) achievement.

e; 3.3; 2-m, 3-r; 4 classes (120 students); 3.3, 3.4; gr. 8; 5 mos.;

non-norm.

Time allotment (b-6)

Other Reference

Rust, 1965	(b-3)

Counting (c-1)

[No dissertations were assigned to this category.]

Number properties and relations (c-2)

O'Daffer, Phares Glyn. An Exploratory Study of the Abilities of Fifth and Seventh Grade Mathematics Students to Learn Finite Group Properties and Structures. (University of Illinois, 1968.) *Dis. Abst.* 30A: 219; July 1969.

Most students learned at least a part of the material, with seventh graders achieving more. Most could correctly combine transformations.

a; ---; 1-only; 2 classes; 3.4, 4.3; grs. 5, 7; 10 days; non-norm.

Other References

Brown, 1957	(b-4)
Cooney, 1970	(t-2b)
Crawford, 1965	(f-1b)
Friede, 1954	(g-4)
Hammond, 1963	(c-3)
Holtan, 1963	(g-5)
Maricle, 1970	(a-4)
Melaragno, 1967	(e-2)
Miller, 1959	(c-22)
Naramore, 1969	(t-2a)
Prielipp, 1968	(c-22)

Hammond, Robert Lee. Ability with the Mathematical Principles Governing the Operations of Addition, Multiplication, Subtraction, and Division. (University of Southern California, 1962.) Dis. Abst. 23: 2372-2373; Jan. 1963. (c-2, f-1a)

Significant relationships were found between a developed test and mental ability, arithmetic ability, and algebra aptitude.

r; ---; 1-only; 300 students; ---; gr. 7; ---; norm, non-norm.

Other References

Brand, 1952	(f-1b)
Buckingham, 1930	(e-1a)
Burrow, 1970	(e-2d)
Maricle, 1970	(a-4)

Whole numbers: Addition (c-3a)

[No dissertations were assigned with a primary reference to this category.]

Other Reference

Johnson, 1967 (e-2c)

Whole numbers: Subtraction (c-3b)

[No dissertations were assigned with a primary reference to this category.]

Other References

Brown, 1957	(a-5d)
Johnson, 1967	(e-2c)

Whole numbers: Multiplication (c-3c)

[No dissertations were assigned with a primary reference to this category.]

Other References

Anderson, 1970	(e-2d)
Beamish, 1968	(d-4)
Gibney, 1962	(e-2b)

Whole numbers: Division (c-3d)

[No dissertations were assigned with a primary reference to this category.]

Other Reference

Anderson, 1970 (e-2d)

Fractions (c-4)

Feinstein, Irwin K. An Analytic Study of the Understandings of Common Fractions Possessed by a Selected Group of Sixth- and Seventh-Grade Pupils. (Northwestern University, 1952.)

Other Reference

Brown, 1957	(b-4)

[No dissertations were assigned to this category.]

Fractions: Subtraction (c-4b)

[No dissertations were assigned to this category.]

Fractions: Multiplication (c-4c)

[No dissertations were assigned to this category.]

Fractions: Division (c-4d)

[No dissertations were assigned to this category.]

Holmes, Paul Roger. The Influence of Anxiety Upon Academic Performance Under Varying Conditions of Task Orientation and Evaluation. (George Peabody College for Teachers, 1966.) Dis. Abst. 27B: 2120-2121; Dec. 1966. (g-4)

No significant differences in arithmetic achievement were found between groups based on anxiety levels receiving different levels of threatening task orientation.

(I) anxiety; task orientation threat. (D) achievement.

a; 3.12; 2-s, 3-s; 378 students; 3.5; gr. 7; ---; norm.

Other Reference

Brown, 1957 (b-4)

Percentage (c-6)

May, Lola June. A Statistical Comparison of the Effectiveness of Teaching Per Cent by the Traditional, Ratio, and Discovery Methods. (Northwestern University, 1965.) Dis. Abst. 26: 3109-3110; Dec. 1966. (c-7)

The discovery method was most effective for immediate learning of percentage, with the ratio method second. The ratio method was most effective on retention tests, followed by the discovery method.

(I) ratio, discovery, or traditional method. (D) achievement.

e; 3.3 r; 2-s, 3-r; 156 students; 3.5; gr. 7; 4 mos. (retention, 6 wks.); non-norm.

McMahon, Della Lorraine. An Experimental Comparison of Two Methods of Teaching Per Cent to Seventh Grade Pupils. (University of Missouri, 1959.) Dis. Abst. 20: 3760; Mar. 1960.

No significant differences between groups taught by the ratio or conventional method were found on tests of interpreting statements about per cent, but the ratio method resulted in greater skill in computation and greater retention.

(I) ratio or conventional method of teaching per cent.
(D) achievement; retention.

e; 3.4 r; 1-only; 245 students (10 classes); ---; gr. 7; 5 wks. (retention, 6 wks.); non-norm.

Montgomery, Clyde Raymond. An Investigation of the Learning of the Three Cases of Percentage in Arithmetic. (State University of Iowa, 1958.) Dis. Abst. 19: 1676-1677; Jan. 1959. (e-1a)

Students solved 71 per cent of 240 test items correctly, 22 per cent incorrectly, and omitted 8 per cent. Correct responses were more numerous in Case I than Case II and in Case II than Case III.

s; ---; 1-only; 20 schools; 1.6; gr. 7; ---; ---.

Wynn, Robert Sawtelle, Jr. A Study of the Relative Efficiency of Three Methods of Teaching Percentage in Grade Seven. (Colorado State College, 1965.) Dis. Abst. 26: 5313; Mar. 1966.

No significant differences in achievement or retention were found between the three methods: Unitary Analysis, Formula, or Decimal.

(I) three methods of teaching percentage. (D) achievement.

e; 3.16 r; 2-s, 3-s; 27 classes; 3.5; gr. 7; 23 days (retention, 6 wks.); non-norm.

Other Reference

Smith, 1968 (c-12)

Ratio and proportion (c-7)

[No dissertations were assigned with a primary reference to this category.]

Other References

Higgins, 1967	(d-8)
May, 1966	(c-6)

Friebel, Allen Calhoun. A Comparative Study of Achievement and Understanding of Measurement Among Students Enrolled in Traditional and Modern School Mathematics Programs. (University of California, Berkeley, 1965.) Dis. Abst. 26: 903-904; Aug. 1965. (a-4, d-9)

Significant differences in reasoning scores favored the SMSG-instructed group over the traditionally taught group, but no differences were found on total achievement or fundamentals scores.

(I) modern or traditional instruction. (D) achievement.

e; 2.3; 2-r, 3-r; 185 students; 2.6, 3.2; gr. 7; 1 yr.; norm, non-norm.

Hanninen, Kenneth Arnold. The Effect of Texture on Tactually Perceived Length in Children. (University of Minnesota, 1968.) Dis. Abst. 30A: 169; July 1969.

Blind children had less length bias than did sighted children, under two training conditions.

(I) training for length perception; blind or sighted pupils.
(D) bias score.

e; 3.4; 2-s; 107 students; 3.2, 3.4; grs. 3, 6, 9; ---; non-norm.

McFee, Evan Earl. The Relative Merits of Two Methodologies of Teaching the Metric System to Seventh Grade Science Students. (Indiana University, 1967.) Dis. Abst. 28A: 4053; Apr. 1968. (d-8)

Science students learned to use the metric system when taught with or without reference to the English system. Mathematical problem-solving ability was related to their ability to perform tasks in metric measures.

(I) metric system taught with or without reference to the English system. (D) achievement.

e; 3.4; 2-s, 3-r; 6 classes; 3.2; gr. 7; 6 days; non-norm.

Measurement (c-8)

Wolfe, Lee R. The Effects of Space Visualization Training on Spatial Ability and Arithmetic Achievement of Junior High School Students. (State University of New York at Albany, 1970.) Dis. Abst. 31A: 2801; Dec. 1970. (g-4)

No significant differences between groups were found on a test of spatial visualization aptitude. Increases in spatial orientation scores were associated with the training program in grade 8, and the training when given before the regular program, had a significant effect on mathematics achievement especially on items with diagrams.

(I) order of space visualization training or regular program.
(D) spatial ability; arithmetic achievement; space visualization achievement.

e; 3.21; 1-only; 6 classes; 3.5; grs. 7-9; 8 wks.; norm, non-norm.

Other References

Anderson, 1958	(d-3)
Brown, 1955	(c-23)
Higgins, 1967	(d-8)
Jenkins, 1968	(e-2c)
Legere, 1962	(d-8)
Mermelstein, 1964	(d-6)
Turner, 1962	(f-1a)

Tremel, Jerome George. A Study of the Relationships Among Basic Ability Factors and the Learning of Selected Operations on the Set of Integers. (Purdue University, 1963.) *Dis. Abst.* 24: 5259-5260; June 1964. (d-9)

Differences in numerical or spatial ability were not found to be related to success in learning to add and multiply with integers; differences in verbal ability, however, were related.

(I) lessons using numerical or spatial visualization abilities.
(D) achievement.

e; 3.3; 2-s, 3-r; 99 students; 6.4; gr. 8; 14 days; norm.

Zelechoski, Robert J. The Learning of Signed Numbers in Grades Seven, Eight, and Nine. (The Pennsylvania State University, 1960.) *Dis. Abst.* 21: 1861; Jan. 1961.

Mental age was found to correlate most highly with gain in knowledge of signed numbers, followed by algebra aptitude.

r; ---; 1-only; 233 students; 3.4, 6.4; grs. 7-9; 25 days; ---.

Other References

Burdick, 1970	(e-3b)
Carry, 1968	(a-4)
Fitzgerald, 1962	(g-4)
Hodges, 1964	(g-4)

Algebra in elementary school (c-10)

[No dissertations were assigned to this category.]

Cheatham, Ben H., Jr. A Comparison of Two Methods of Introducing Selected Geometric Concepts to Seventh Grade Students. (The University of Florida, 1969.) Dis. Abst. 31A: 1132; Sept. 1970. (d-3)

Gains in geometric concepts were not significantly different for those who constructed models with compass and straightedge or with paperfolding techniques.

(I) two types of materials. (D) achievement.

e; 3.4; 1-only; 6 classes; ---; gr. 7; 2 wks.; non-norm.

D'Augustine, Charles Henry. Factors Relating to Achievement with Selected Topics in Geometry and Topology When Taught to Fifth-, Sixth- and Seventh-Grade Pupils Via a Programed Text. (The Florida State University, 1963.) Dis. Abst. 24: 4538-4539; May 1964. (b-5, d-5)

No significant differences between groups using programs on geometric and topological topics for 30- or 50-minute periods, or having no programs, were found.

(I) use of program; time allotted. (D) achievement.

e; 3.12; 2-s, 3-s; 260 students; 3.2, 3.3, 3.4, 3.5; grs. 5-7;

2 wks.; non-norm.

Davis, Edward J. A Study of the Ability of Selected School Pupils to Perceive the Plane Sections of Selected Solid Figures. (The University of Florida, 1969.) Dis. Abst. 31A: 57; July 1970. (g-7d)

Sixth graders scored significantly below those in grades 8 and 10 in performance with four solids and each of four cuts performed on the solids.

s; ---; 2-s, 3-s; 90 students; ---; grs. 6, 8, 10; ---; non-norm.

Geometry in elementary school (c-11)

Neatrour, Charles Raymond. Geometric Content in the Mathematics Curriculum of the Middle School. (Indiana University, 1968.) *Dis. Abst.* 29A: 3531-3532; Apr. 1969. (d-1)

While the amount of geometric content varied greatly, three times as much was included as in 1900, with emphasis on informal geometry.

d; ---; ---; ---; ---; grs. 5-8; ---; ---.

Palow, William Paul. A Study of the Ability of Public School Students to Visualize Particular Perspectives of Selected Solid Figures. (The University of Florida, 1969.) *Dis. Abst.* 31A: 78-79; July 1970. (g-7d)

Children appeared to acquire the ability to visualize sections of solid figures (Euclidean space) at about age 12, supporting Piaget's position.

s; ---; 2-s; 120 students; 3.4, 3.5, 3.20; grs. 3-12; ---; non-norm.

Other References

Corley, 1959	(c-13)
Fitzgerald, 1962	(g-4)
Martin, 1967	(t-1a)

Smith, Howard Kenneth. The Effects of Instruction in Set Theory Upon the Logical Reasoning of Seventh-Grade Students and Subsequent Effects Upon Their Learning to Solve Percentage Problems. (Arizona State University, 1968.) Dis. Abst. 28A: 4963; June 1968. (c-6, g-4)

Students who received instruction in set theory showed significant superiority in logical reasoning than those who were taught traditional mathematics for the same period. No significant differences in ability to solve percentage problems were observed between groups.

(I) instruction in set theory or reteaching of operations.
(D) reasoning scores.

e; 3.3; 2-s, 3-r; 129 students; 1.5, 3.2, 3.4; gr. 7; 20 days; norm.

Other References

Eigen, 1964	(d-5)
MacPherson, 1967	(e-5)

Logic and proofs (c-13)

Byham, Frederick Charles. Indirect Proof in Geometry from Euclid to the Present. (The Ohio State University, 1969.) Dis. Abst. 30A: 2899; Jan. 1970. (b-3, c-23, d-1)

Following a survey of geometry texts published since 1955 and other books and articles on logic and mathematics, it was recommended that the methods of inconsistency and of contraposition be used in high school mathematics.

d; ---; ---; ---; ---; gr. 10; ---; ---.

Corley, Glyn Jackson. An Experiment in Teaching Logical Thinking and Demonstrative Geometry in Grades Six Through Ten. (George Peabody College for Teachers, 1959.) Dis. Abst. 20: 1375; Oct. 1959. (c-11, c-23, g-4)

Ability to learn geometric terms and concepts was found to be quite well-developed in grade 6, and improved consistently to grade 10. Understanding of how to reach conclusions was moderately well-developed in grade 6. Logical structure and proofs were found to be understood consistently better in grade 7 and above.

a; ---; 2-s; ---; 3.2; grs. 6-10; 5 wks.; non-norm.

Deer, George Wendell. The Effects of Teaching an Explicit Unit in Logic on Students' Ability to Prove Theorems in Geometry. (The Florida State University, 1969.) Dis. Abst. 30B: 2284-2285; Nov. 1969. (c-23)

No significant differences were found between a group which had studied a brief unit on logic and one which had not in ability to write proofs.

(I) teaching a unit on logic. (D) achievement scores.

e; 3.4; 2-s; 1 class (26 students); ---; gr. 10; 18 days; non-norm.

Hale, William Thomas. The Development and Evaluation of Text Materials Covering Topics from Formal Logic as Related to the Teaching of High School Mathematics. (University of Illinois, 1964.) Dis. Abst. 25: 4477; Feb. 1965. (d-5)

The text on logic was found to be suitable for mathematics students in grades 9-12, and for those in grade 8 who had begun algebra.

a; ---; 1-only; 502 students; 1.4; grs. 8-12; 3-5 wks.; non-norm.

Hildebrand, Francis Howard. An Approach to Teaching Mathematical Induction to Adolescent Boys. (Michigan State University, 1968.) Dis. Abst. 29A: 497; Aug. 1968.

Scores of high achieving students correlated significantly with three scales measuring response patterns.

r; ---; 1-only; 50 boys; 3.2, 6.4; gr. 7; 960 mins.; non-norm.

Howell, Edgar N. Recognition of Selected Inference Patterns by Secondary School Mathematics Students. (The University of Wisconsin, 1965.) Dis. Abst. 26: 5292; Mar. 1966. (e-6, g-4)

Growth in inferential reasoning ability without formal instruction in logic improves slightly with increasing grade level. However, fewer than one-third demonstrated understanding of about half of the ten inference patterns tested.

(I) grade level; sex. (D) inferential reasoning ability.

f; ---; 2-s, 3-s; 164 students; 3.2, 3.5; grs. 7-9; ---; norm, non-

norm.

Hrabi, James Stanley. An Experimental Study of a Unit on Logic and Proof Strategy in the Grades Seven and Nine Mathematics Curriculum. (University of Colorado, 1967.) Dis. Abst. 28A: 3528; Mar. 1968. (g-4)

No significant differences in critical thinking ability were found between classes in grade 7 who used a unit on logic and proof, and those not using the unit, but there was a significant difference in grade 9 for girls immediately after instruction and for both sexes after two months.

(I) use of unit on logic and proof strategy. (D) achievement.

e; 3.4; 2-s, 3-s; 10 classes; 3.5; grs. 7, 9; ---; norm, non-norm.

Lazar, Nathan. The Importance of Certain Concepts and Laws of Logic for the Teaching of Geometry. (Teachers College, Columbia University, 1937.) (c-23)

Logic and proofs (c-13)

Miller, William Anton. The Acceptance and Recognition of Six Logical Inference Patterns by Secondary Students. (The University of Wisconsin - Madison, 1968.) Dis. Abst. 29A: 1685-1686; Dec. 1968.

The majority of students tested in all three grades accepted both the valid and invalid patterns as valid.

(I) grade; sex; ability; pattern and content of test. (D) ability to recognize patterns.

s; ---; 2-r, 3-r; 660 students; 3.2, grs. 8, 10, 12; ---; non-norm.

Platt, John Lewis. The Effect of the Use of Mathematical Logic in High School Geometry: An Experimental Study. (Colorado State College, 1967.) Dis. Abst. 28A: 4544-4545; May 1968. (ERIC Document No. ED 024 568) (c-23)

No significant differences in achievement or attitude were found between classes which had a unit on logic and those which did not. It appears to be more effective with high-achieving students.

(I) unit on logic. (D) achievement; attitude.

e; 3.4; 2-s, 3-r; 12 classes; 3.2; gr. 10; 4 wks.; non-norm.

Retzer, Kenneth Albert. The Effect of Teaching Certain Concepts of Logic on Verbalization of Discovered Mathematical Generalizations. (University of Illinois, 1967.) Dis. Abst. 28A: 1351-1352; Oct. 1967. (d-5, g-3)

Generalizations were verbalized more precisely by the group completing the unit on logic.

(I) programmed or regular instruction on logic; ability level. (D) achievement.

e; ---; 1-only; 80 students; 3.2; grs. 7, 8; ---; non-norm.

Roberge, James Joseph. An Investigation of Children's Abilities to Reason with Principles of Class Reasoning and Their Isomorphs in Conditional Reasoning. (The University of Connecticut, 1969.) Dis. Abst. 30A: 592-593; Aug. 1969. (f-1a, g-4)

Class reasoning was significantly easier than conditional reasoning, though neither was consistently easier at all grade levels. Differences for content dimensions were significant; concrete-familiar was easiest, then suggestive, then abstract.

f; ---; 2-s; 263 students; 3.2, 6.1; grs. 4-10; ---; non-norm.

Robinson, G. Edith. An Investigation of Junior High School Students' Spontaneous Use of Proof to Justify Mathematical Generalizations. (The University of Wisconsin, 1964.) Dis. Abst. 25: 2300; Oct. 1964. (a-4, g-4)

Three-fourths of the students gave at least one proof response. Most seventh graders could justify mathematical generalizations with a proof when concepts were familiar to them.

f; ---; 1-only; 48 students; 1.4, 1.6; grs. 7, 9; ---; ---.

Smith, Eugene Preston. A Developmental Approach to Teaching the Concept of Proof in Elementary and Secondary School Mathematics. (The Ohio State University, 1959.) Dis. Abst. 20: 3668-3669; Mar. 1960.

Suggestions are made for helping students evolve a continuously more mature concept of proof as they study arithmetic, algebra, geometry, and trigonometry. The emphasis is on changes in methodology, but some new topics are included.

d; ---; ---; ---; ---; grs. K-12; ---; ---.

Logic and proofs (c-13)

Other References

Bree, 1969	(g-4)
Brockman, 1963	(t-2b)
Brown, 1957	(b-4)
Cooney, 1970	(t-2b)
Haenisch, 1967	(c-22)
Heisey, 1966	(t-1b)
Hesch, 1956	(t-2)
Holmes, 1969	(c-16)
Kaufmann, 1969	(c-22)
Koppenhaver, 1943	(a-4)
Lankford, 1938	(c-23)
Myers, 1956	(c-23)
Nelson, 1962	(d-5)
Patterson, 1970	(a-4)
Shumway, 1970	(g-4)

The decimal numeration system (c-14)

[No dissertations were assigned with a primary reference to this category.]

Other References

Fitzgerald, 1962	(g-4)
Neuhouser, 1965	(a-4)

Other numeration systems (c-15)

Glaser, Anton. History of Modern Numeration Systems. (Temple University, 1969.) Dis. Abst. 31B: 1396-1397; Sept. 1970. (d-1, d-9)

The development of fully positional numeration systems was traced from 1500 to the present. Review of selected textbooks for teachers and of SMSG seventh grade materials indicated that base 5 or 7 was most commonly used.

d; ---; ---; ---; ---; gr. 7; ---; ---.

Jackson, Robert Loring. Numeration Systems: An Experimental Study of Achievement on Selected Objectives of Mathematics Education Resulting from the Study of Different Numeration Systems. (University of Minnesota, 1965.) Dis. Abst. 26: 5292-5293; Mar. 1966.

Pupils receiving instruction in non-decimal numeration systems did significantly better in tests measuring understanding and problem solving skills than those studying the decimal system. However, those receiving instruction in the decimal system did better in computational skills than those receiving instruction in non-decimal systems.

(I) study of decimal or non-decimal system. (D) achievement.

e; 3.3; 2-s, 3-r; 599 students; 3.5; grs. 5, 7; ---; norm, non-norm.

Other References

Barcaski, 1970	(a-4)
Behr, 1967	(g-4)
Jamison, 1963	(d-3)
Oates, 1966	(d-5)

Beberman, Max. The Teaching of Statistics in Secondary School Mathematics. (Teachers College, Columbia University, 1952.)

Bridges, Charles Martin. The Application of Elementary Statistics in Analysis of Data by Selected Secondary School Students. (The University of Tennessee, 1959.) Dis. Abst. 20: 1223; Oct. 1959.

The group who had instruction in statistics and probability made significantly higher scores on a test of proficiency with statistical inference than did a geometry class.

(I) instruction in statistics and probability. (D) achievement.

e; 3.4; 2-s; 50 students; 3.4; grs. 11, 12; ---; non-norm.

Holmes, Allen Harold. Teaching the Logic of Statistical Analysis by the Monte Carlo Approach. (University of Illinois, 1968.) Dis. Abst. 30A: 209; July 1969. (c-13)

Bright students were able to learn the procedures for the statistical analysis and, as a class, demonstrated "clear insight" into the logic of the decision-making process.

a; ---; 2-s; 3 classes; ---; gr. 12; ---; ---.

Leake, Lowell, Jr. The Status of Three Concepts of Probability in Children of Seventh, Eighth and Ninth Grades. (The University of Wisconsin, 1962.) Dis. Abst. 23: 2010-2011; Dec. 1962.

No significant differences were found in scores on tests on understanding of probability of sample space, simple event, or union of mutually exclusive events.

(I) school; grade; sex; achievement. (D) probability scores.

f; ---; 2-r; 72 students; 3.2; grs. 7-9; ---; ---.

Leffin, Walter William. A Study of Three Concepts of Probability Possessed by Children in the Fourth, Fifth, Sixth and Seventh Grades. (The University of Wisconsin, 1968.) Dis. Abst. 29A: 4397; June 1969.

Children acquired considerable knowledge about probability and could apply these concepts in a variety of situations.

Probability and statistics (c-16)

f; ---; 2-s, 3-r; 528 students; 3.2, 3.5; grs. 4-7; ---; non-norm.

McKinley, James Ernest. Relationship Between Selected Factors and Achievement in a Unit on Probability and Statistics for Twelfth Grade Students. (University of Pittsburgh, 1960.) Dis. Abst. 21: 561-562; Sept. 1960.

Intelligence, reading ability, and previous mathematics achievement were found to be correlated (.68) with achievement on the unit on probability and statistics.

r; ---; 2-s; 10 classes; 6.2, 6.3, 6.4; gr. 12; 13 periods; non-norm.

O'Toole, Alphonsus L. Statistics in the Secondary School Curriculum. (Harvard University, Graduate School of Education, 1952.)

Shulte, Albert Philip. The Effects of a Unit in Probability and Statistics on Students and Teachers of Ninth-Grade General Mathematics. (The University of Michigan, 1967.) Dis. Abst. 28A: 4962; June 1968. (c-21)

The unit was not effective in promoting improved student attitude toward mathematics. It did not improve computational skill, but was effective in increasing proficiency in other mathematical areas.

(I) unit on probability and statistics. (D) achievement; attitude.

e; 3.4; 2-s, 3-s; 35 classes; ---; gr. 9; 5-15 wks.; norm, non-norm.

Smith, Malcolm Augustus. Development and Preliminary Evaluation of a Unit on Probability and Statistics at the Junior High School Level. (University of Georgia, 1966.) Dis. Abst. 27A: 1723; Dec. 1966.

No significant differences were found between groups taught or not taught a unit on probability and statistics, but some topics seemed to be appropriate for most seventh-grade students.

(I) unit on probability and statistics. (D) achievement.

Probability and statistics (c-16)

e; 3.4; 2-3, 3-r; 6 classes; 3.5; gr. 7; 17 days; non-norm.

Other References

Carlow, 1968	(a-4)
Fejfar, 1964	(d-5)
Polowy, 1958	(c-22)

Functions; graphing (c-17)

Buchanan, O. Lexton, Jr. A Unit on Limits for the Twelfth-Year Course in Mathematics. (University of Kansas, 1964.) Dis. Abst. 26: 219; July 1965.

Student attitudes toward the unit on limits were at least as favorable as those toward other topics.

a; ---; 1-only; 17 classes (322 students); ---; gr. 12; 4 wks.; ---.

Hamley, Herbert R. The Function Concept in Secondary School Mathematics. (Teachers College, Columbia University, 1932.)

Hight, Donald Wayne. A Study of the Limit Concept in the SMSG Revised Sample Textbooks. (Oklahoma State University, 1961.) Dis. Abst. 23: 554-555; Aug. 1962. (d-1, d-9)

A rigorous treatment of the limit concept (as found in college calculus texts) was embedded into SMSG revised textbooks.

d; ---; ---; ---; ---; grs. 9-12; ---; ---.

Isaac, Herbert Leopold. The Effectiveness of an Open Interval Approach to the Limit Concept for a 12th Year Mathematics Course. (Columbia University, 1967.) Dis. Abst. 31B: 286; July 1970. (c-25)

A unit on the limit concept was developed as preparation for calculus. Students using it scored significantly higher than those not using it, on an experimenter-developed test.

(I) unit on limits or regular course. (D) achievement.

e; 3.22; 1-only; 142 students; 3.4; gr. 12; 4 wks.; non-norm.

Izzo, Joseph Anthony. A History of the Use of Certain Types of Graphical Representation in Mathematics Education in the Secondary Schools of the United States. (Columbia University, 1957.) Dis. Abst. 17: 1506-1507; July 1957. (a-1, d-1)

Graphs first appeared in trigonometry textbooks in 1826 and in algebra textbooks in 1883. Attention given to graphs since 1900 has been tremendous.

d; ---; ---; 627 textbooks; ---; ---; ---; ---.

Nelson, Leonard Theodore. The Relationship Between Verbal, Visual-Spatial, and Numerical Abilities and the Learning of the Mathematical Concept of Function. (The University of Michigan, 1968.) Dis. Abst. 30A: 218; July 1969.

The Visual approach was more effective than the other approaches on tests designed for each. There was no evidence to indicate an interdependence between the three abilities and corresponding approaches; numerical ability was a better predictor.

(I) verbal, visual, numerical or eclectic procedures. (D) achievement; retention.

e; 3,12 r; 2-s, 3-s; 12 classes (284 students); 1,4; gr. 8; retention after 25 days; norm, non-norm.

Reeves, James William. A Critical Analysis of the Function Concept in Secondary School Mathematics. (The University of Florida, 1969.) Dis. Abst. 31A: 1148-1149; Sept. 1970. (d-1, p-1)

In secondary school textbooks, function was generally developed as a set of ordered pairs, in very abstract form. Agreement was found on 16 points regarding functions in over one-half of the college texts analyzed.

d; ---; ---; ---; ---; sec., college; ---; ---.

Smith, Lehi Tingen. The Role of Maturity in Acquiring a Concept of Limit in Mathematics. (Stanford University, 1959.) Dis. Abst. 20: 1288-1289; Oct. 1959. (b-4, f-2a)

Conceptualization of limits was better achieved by instruction on the topic than by maturity alone.

a; ---; 2-s, 3-s; 578 students; ---; grs. 7-12; 3 hrs.; non-norm.

Thomas, Halsey Laverne. An Analysis of Stages in the Attainment of a Concept of Function. (Columbia University, 1969.) Dis. Abst. 30A: 4163-4164; Apr. 1970. (d-9)

Capable students at ages 11-14 could reach a relatively high level of attainment of the function concept and many could achieve understanding at an initial formal operational level.

Functions; graphing (c-17)

s; ---; 2-s; 201 students; ---; grs. 7, 8 (ages 11-14); ---; non-norm.

Other References

Carry, 1968	(a-4)
Dessart, 1963	(d-5)
Eigen, 1964	(d-5)
Humphry, 1955	(d-1)
Lackner, 1969	(a-4)
Olsen, 1969	(b-3)

Basic arithmetic procedures
in secondary school (c-20)

Bush, William Jack. An Analysis of the Outcomes of Functional Mathematics and Formal Mathematics as Measured by Certain Objective Tests After Completion by the Students of Two Years of Study. (University of Arkansas, 1959.) Dis. Abst. 20: 920-921; Sept. 1959. (a-2, b-4, f-1b)

Students who completed two years of continuous study in formal (traditional) mathematics scored significantly higher than those in functional mathematics.

f; ---; ---; ---; ---; ---; 2 yrs.; ---; ---.

Davis, David John. A Comparative Study of Achievement Levels of Twelfth Grade Pupils on a Test Designed to Measure Functional Competence in Mathematics. (University of Michigan, 1950.) Dis. Abst. 10: 37-38; Issue No. 2, 1950. (b-4, e-6, f-1b)

Differences in achievement were found between boys and girls when type of mathematical training was not considered. Achievement level increased as years of training increased, but nearly all with two or fewer years of mathematics had an inadequate grasp of essentials.

f; ---; ---; 2,949 students; 3.4; gr. 12; ---; ---.

Other References

Brand, 1952	(f-1b)
Brown, 1957	(f-1b)
Buckingham, 1930	(e-1a)
Gamble, 1966	(c-26)
Heshauer, 1948	(f-2)
Irvin, 1952	(b-3)
Renner, 1955	(f-1b)

General Mathematics course (c-21)

Rochlin, Isaiah. Nonintellectual Factors in the Learning of General Mathematics. (University of Chicago, 1952.) (a-6)

Other References

Beckman, 1951	(f-2)
Eirich, 1968	(c-26)
Findley, 1967	(d-1)
Hlavaty, 1950	(c-26)
Holtan, 1963	(g-5)
Howitz, 1966	(a-4)
Irvin, 1952	(b-3)
Madden, 1966	(a-3)
Matlin, 1960	(d-2)
Maynard, 1970	(a-4)
Nix, 1970	(e-4)
Price, 1966	(a-4)
Sederberg, 1964	(e-2b)
Shulte, 1968	(c-16)
Strickland, 1969	(a-4)
Wiebe, 1966	(d-5)
Willets, 1944	(a-5i)
Wolfe, 1969	(t-2d)

Bailey, Lawrence G. The Evaluation of a Technique of Study for First Year Algebra. (University of Wisconsin, 1931.) (a-5e)

Haenisch, Siegfried. A Study of the Place of Logic in an Elementary Algebra Course. (Rutgers - The State University, 1967.) Dis. Abst. 28A: 1731; Nov. 1967. (b-3, c-13)

An outline for an algebra course using logic in a deductive approach was prepared. One chapter was expanded and used with one class.

a; ---; 1-only; 1 class; ---; gr. 8; ---; non-norm.

Hirschi, Lewis Edwin. A Concept Approach to the Teaching of Algebra. (University of Utah, 1956.) Dis. Abst. 17: 778-779; Apr. 1957. (a-4)

The "concept" method was found to be superior to the "traditional" method on the special treatment test, but no significant differences were found on a standardized test.

(I) use of traditional or concept method. (D) achievement.

e; 3.4; ---; ---; ---; gr. 9; ---; norm, non-norm.

Jackson, William Nichols. The Role of Algebra in the Development of Relational Thinking. (The Ohio State University, 1952.) Dis. Abst. 17: 2936-2938; Dec. 1957. (g-4)

Students generally improved in ability to perceive various types of relationships in data and in recognizing limitations in data.

(I) stress on interpretation of data. (D) perception of relationships and limitations of data.

a; ---; 1-only; 2 classes; 1.5, 1.6, 3.4; gr. 9; 1 yr.; norm.

Kaufmann, Jerome E. The Essentials of a Deductive System in Elementary Algebra: An Analysis of Textbooks and the Opinions of Mathematics Educators. (University of Virginia, 1968.) Dis. Abst. 29A: 2607-2608; Feb. 1969. (c-13, d-1)

A large majority of mathematics educators favored a deductive structuring of algebra, including basic concepts of logic and a variety of methods of proof. Most textbooks did not reflect this emphasis.

Algebra course (c-22)

s; ---; 2-r; 183 educators; ---; gr. 9; ---; ---

Kellar, Wylma R. The Relative Contribution of Certain Factors to Individual Differences in Algebraic Problem Solving Ability. (Catholic University of America, 1940.) (e-1)

Landis, William Albert. The Problem in High School Algebra. (Yale University, 1935.)

Lankton, Robert Stanley. Evaluation of Achievement and Comparisons of Achievement in First Year Algebra of Public High School Students Grouped According to Their Mathematical Backgrounds and Interests. (University of Michigan, 1951.) Dis. Abst. 11: 584-585; Issue No. 3, 1951.

Competence in first year algebra was found to be low; most students had a poor mastery of algebraic principles and processes.

s; ---; 2-s; 1,147 students; 3.2, 3.4; gr. 9; ---; norm.

Lawson, Fred Russell. A Comparative Study of the Achievement of Eighth and Ninth Grade Students in Beginning Algebra. (The University of Oklahoma, 1961.) Dis. Abst. 22: 1197-1198, Oct. 1961. (d-9)

The eighth grade students achieved significantly greater scores and gains in algebra than did ninth grade students. No significant differences were found for ability levels, sex, or type of program (SMSG or traditional).

f; ---; 2-s; 4 classes (128 students); ---; grs. 8, 9; ---; norm.

Miller, Herbert Francis. The Combination of the Guess-and-Check and Multi-Equation Methods for Deriving the Equations for Verbal Problems in Elementary Algebra. (The Ohio State University, 1959.) Dis. Abst. 20: 2180; Dec. 1959. (a-5b, c-2)

No significant differences existed between groups taught combination or uni-equation methods for solving problems.

(I) use of combination or uni-equation method of solving problems.
(D) ability to write equations.

e; 3.4; 2-s; 13 classes; ---; gr. 9; ---; non-norm.

Monk, Oliver Paul. A Study of Topics in College Preparatory Mathematics with Evaluation of the Use of a Manual in Matrix Algebra for In-Service Education. (University of Houston, 1966.) Dis. Abst. 27A: 985-986; Oct. 1966. (b-3, d-1)

Students gained in knowledge of matrix algebra, and teachers of varying experience and background were found able to use the manual.

a; ---; 2-s; 84 students, 97 teachers; 1.6, 3.2, 3.3, 6.4; gr. 12;

---; non-norm.

Polowy, Henry. The Implications of the Modern Probability Theory for Algebra. (New York University, 1957.) Dis. Abst. 18: 1057· Mar. 1958. (b-3, c-16)

It was concluded that the axiomatic model of probability is adaptable as a basis for the study of probability in algebra provided the mathematical concepts on which it is based are developed in an elementary form.

d; ---; ---; ---; ---; gr. 9; ---; ---.

Prielipp, Robert Walter. The Effect of Textbook, Sex, and Setting of the Problem on the Ability of First Year Algebra Students to Recognize Three Properties of an Abelian Group. (The University of Wisconsin, 1967.) Dis. Abst. 28A: 4545-4546; May 1968. (c-2)

Use of the formal textbook resulted in significantly higher achievement than use of an informal textbook. Commutativity is the easiest of the properties studied, followed by identity element and inverses.

(I) informal or formal textbook-structure. (D) concept understanding.

f; ---; 2-s, 3-r; 40 students; 3.2; gr. 9; ---; non-norm.

Schuppener, Dale M. A Technique of Study for the Use of the Formula. (University of Wisconsin, 1935.) (a-5e)

Shover, Carolyn Grace. On the Class Number and Ideal Multiplication in a Rational Linear Associative Algebra. (University of Ohio, 1932.) (m-3)

Algebra course (c-22)

Smart, James Richard. Algebra, a Modern Secondary School Subject. (George Peabody College for Teachers, 1957.) Dis. Abst. 18: 604; Feb. 1958.

Outlines for three experimental algebra courses resulted from description of traditional algebra courses.

d; ---; ---; ---; ---; ---; ---; ---.

Waggoner, Sherman G. The Ability of Pupils to Interpret Certain Basic Ideas in Linear Equations. (University of Iowa, 1932.)

Other References

Alston, 1944	(a-5b)
Anglin, 1966	(f-2c)
Ashton, 1962	(a-4)
Bailey, H. P., 1968	(e-4)
Baker, 1961	(e-3)
Ballew, 1966	(a-4)
Bechtold, 1965	(a-5b)
Becker, 1967	(a-4)
Beckman, 1951	(f-2)
Belcastro, 1962	(d-5)
Berger, 1962	(d-4)
Blair, 1964	(a-4)
Brown, 1970	(a-4)
Buckingham, 1930	(e-1a)
Buethe, 1966	(d-8)
Callister, 1966	(e-5)
Carry, 1968	(a-4)
Clark, 1966	(a-4)
Clewell, 1965	(d-8)
Dahmus, 1968	(d-9)
Davis, 1967	(d-5)
Dean, 1968	(a-5f)
Denmark, 1965	(a-4)
Devine, 1967	(d-5)
Dirr, 1967	(g-4)
Dixon, B. G., 1968	(t-1a)
Dixon, L. J., 1964	(d-9)
Drake, 1938	(d-7)
Duncan, 1961	(f-2c)
Eirich, 1968	(c-26)
Ferguson, 1957	(f-1a)
Friesen, 1961	(e-3b)
Garner, 1963	(f-4)
Ginther, 1965	(d-1)
Greitzer, 1960	(a-4)
Hansen, 1963	(b-6)
Hemphill, 1941	(d-7)
Howe, 1967	(t-1b)

Algebra course (c-22)

Johnson, D. C., 1966	(a-4)
Johnson, E., 1934	(f-2c)
Kennedy, 1964	(t-1)
King, 1955	(d-1)
Kline, 1961	(f-1a)
Leonard, 1967	(f-1b)
Lichtenberg, 1967	(a-1)
Long, 1958	(e-3)
Lovett, 1969	(f-2c)
McCardle, 1959	(f-4)
McIntosh, 1965	(d-9)
McKim, 1942	(d-7)
McLean, 1960	(b-3)
Merfeld, 1969	(b-3)
Moore, 1944	(f-2c)
Moses, 1962	(d-5)
Nelson, 1932	(a-1)
Orleans, 1931	(f-2c)
Ottina, 1964	(g-6a)
Palmer, 1968	(d-1)
Payne, H. I., 1965	(a-4)
Payne, J. N., 1955	(e-3)
Peak, 1955	(e-1a)
Pickard, 1948	(a-1)
Poppen, 1950	(f-1)
Proctor, 1968	(a-5i)
Rafiq, 1965	(d-5)
Rajaratnam, 1958	(d-1)
Ray, 1961	(e-3)
Red, 1942	(f-2)
Roberts, 1966	(d-1)
Robson, 1966	(d-5)
Romberg, 1968	(f-1a)
Rushton, 1963	(g-2)
Sabers, 1968	(f-1a)
Schaaf, 1959	(g-2)
Sears, 1950	(f-2)
Sederberg, 1964	(e-2b)
Silas, 1932	(e-1a)
Sligo, 1955	(f-1b)
Sobel, 1954	(a-4)
Soeteber, 1970	(f-4)
Sooy, 1970	(b-3)
Steinbrenner, 1955	(b-3)
Stokes, 1958	(e-3b)
Tiemens, 1963	(g-5)
Treacy, 1960	(a-6)
Tucker, 1970	(b-2)
Wells, 1960	(a-4)
White, 1930	(g-2)
Willets, 1944	(a-5i)
Wolfe, M. S., 1963	(a-4)
Wolfe, R. E., 1969	(t-2d)
Zamboni, 1969	(e-5)

Geometry course (c-23)

Albrecht, Walter August, Jr. A Critical and Historical Study of the Role of Ruler and Compass Constructions in the Teaching of High School Geometry in the United States. (The Ohio State University, 1952.) Dis. Abst. 18: 157-160; Jan. 1958. (a-1, d-1, d-3)

After extensive analysis of textbooks and other historical materials, it is concluded that exclusive or prolonged use of ruler and compass in high school geometry cannot be justified.

d; ---; ---; 70 textbooks, manuals, books, articles; ---; gr. 10;

---; ---.

Ayre, Henry G. An Analytical Study of Individual Differences in Plane Geometry. (George Peabody College for Teachers, 1939.) (e-1)

Badger, Blanche Crisp. An Analysis of the Evolving Evaluation Program in Elementary Geometry. (George Peabody College for Teachers, 1956.) Dis. Abst. 17: 571; Mar. 1957. (f-1a)

While knowledge of geometric subject matter and ability to apply formulas, theorems, deductive reasoning, and analysis seem adequately tested, several other important aspects are not included on geometry achievement tests.

d; ---; ---; ---; ---; gr. 10; ---; ---.

Beard, Earl M. L. An Axiom System for High School Geometry Based on Isometries. (The University of Wisconsin, 1968.) Dis. Abst. 29A: 1667-1668; Dec. 1968. (ERIC Document No. ED 028 926)

A geometry was developed from fundamentals, using the properties of real numbers and involving transformations at an early stage.

d; ---; ---; ---; ---; gr. 10; ---; ---.

Bradley, A. Day. Geometry of Repeating Design and Geometry of Design for High Schools. (Teachers College, Columbia University, 1932.) (m-3)

Brown, Francis Robert. The Effect of an Experimental Course in Geometry on Ability to Visualize in Three Dimensions. (University of Illinois, 1954.) Dis. Abst. 15: 83-84; Jan. 1955. (c-8)

Students taking a two-year sequence of plane and solid geometry and advanced algebra gained significantly more in spatial visualization than those taking a one-year sequence of plane and solid geometry. With other groups, students taking only plane geometry gained more than those studying plane geometry used with solid geometry.

(I) two-year sequence or one-year course. (D) space relations scores.

e; 3.4; 2-s; 423 students; 3.5; grs. 10, 11; 2 yrs.; norm.

Bundrick, Charles Michael. A Comparison of Two Methods of Teaching Selected Topics in Plane Analytic Geometry. (The Florida State University, 1968.) Dis. Abst. 30A: 485-486; Aug. 1969.

Students using a vector approach achieved significantly higher than those using a traditional approach on both the criterion and transfer tests.

(I) plane analytic geometry with a vector or a traditional approach. (D) achievement; transfer.

e; 3.8; 2-s, 3-s; 50 students; ---; Algebra II; ---; non-norm.

Christofferson, Harold W. Geometry Professionalized for Teachers. (Teachers College, Columbia University, 1933.) (m-3)

Cohen, Louis. An Evaluation of a Technique to Improve Space Perception Abilities Through the Construction of Models by Students in a Course in Solid Geometry. (Yeshiva University, 1959.) Dis. Abst. 21: 1136; Nov. 1960. (d-3)

No significant difference in space perception was found for students who constructed models and those who did not.

(I) construction of models. (D) space perception scores.

e; 3.1; 2-m; 126 students; ---; gr. 12; 5 mos.; norm, non-norm.

Geometry course (c-23)

Cronbach, Lee Joseph. Individual Differences in Learning to Reproduce Plane Figures. (University of Chicago, 1940.) (e-1)

Davis, John Newton. The Effects of High School Coordinate Geometry. (Stanford University, 1970.) Dis. Abst. 31A: 2246; Nov. 1970. (d-9)

Students using the SMSG course on coordinate geometry generally did significantly better than students using the regular SMSG geometry course or a more traditional course.

(I) SMSG Geometry, SMSG Geometry with Coordinates, or a plane and solid geometry course. (D) achievement scores; retention.

e; 3.15 r; 2-s, 3-r; 24 classes; 3.5, 3.6; grs. 9, 10; 1 yr.; non-

norm.

Davis, Kenneth Searle. Applications of Plane Geometry by High School Pupils. (University of Missouri, 1942.)

Farrell, Margaret Alice. Pattern Centering and Its Relation to Secondary School Geometry Teaching: The Formation of Hypotheses. (Indiana University, 1967.) Dis. Abst. 28A: 3552-3553; Mar. 1968. (g-4, g-7d)

"Pattern centering" was found to be a plausible approach to teaching geometry.

d; ---; ---; ---; ---; gr. 10; ---; ---.

Johnson, Alonzo Franklin. SMSG Geometry as a Real Vector Space. (Oklahoma State University, 1967.) Dis. Abst. 28A: 4936; June 1968. (c-30, d-9, m-3)

A Euclidean vector space was assumed, and 22 postulates of a geometry text were proved, thus exhibiting a model for use in teacher training.

d; ---; ---; ---; ---; sec.; ---; ---.

Kriegsman, Helen Florence. Proposal for Integrating the Concepts of Plane and Solid Geometry Based on Student Thinking About the Concept of Dimension. (The Ohio State University, 1964.) Dis. Abst. 25: 1046-1047; Aug. 1964. (g-4)

The group in which the concept of dimension was emphasized scored significantly higher than other groups.

(I) combined plane-solid geometry, plane geometry only, dimension-oriented geometry course. (D) achievement.

a; ---; 2-s, 3-s; ---; ---; gr. 10; 1 yr.; non-norm.

Lane, Ruth Onetta. The Efficacy of Pupil Selection of Graded Originals in Plane Geometry. (State University of Iowa, 1937.)

Lankford, Francis Greenfield, Jr. A Study of Elements and Proofs of Plane Geometry. (University of Virginia, 1938.) (c-13)

Love, Sister Marie Genevieve. Instruction in Geometry in the Junior High School. (Columbia University, 1963.) Dis. Abst. 24: 5246-5247; June 1964. (d-1)

Suggestions for geometric instruction in junior high schools were made following analysis of textbooks for grades 3-12.

d; ---; ---; ---; ---; grs. 7, 8; ---; ---.

Lundberg, Gustave H. Significant Influences Affecting Geometry as a Secondary School Subject. (George Peabody College for Teachers, 1952.)

Marshall, Harold W. Study Helps in Solution of Exercises in Geometry. (University of Wisconsin, 1937.) (a-5e)

Myers, Sheldon Stephen. The Nature of Definition in High-School Geometry, A Critique of Current Practices. (The Ohio State University, 1955.) Dis. Abst. 16: 716-717; Apr. 1956. (c-13, d-1)

Widespread discrepancies between textbook practices and the treatment of definition recommended in mathematical and logical literature were found. Much of the Aristotelian theory of definition was shown to be no longer valid.

Geometry course (c-23)

d; ---; ---; ---; ---; gr. 10; ---; ---.

Ranucci, Ernest Raymond. Effect of the Study of Solid Geometry on Certain Aspects of Space Perception Abilities. (Columbia University, 1952.) Dis. Abst. 12: 662-663; Issue No. 5, 1952.

The group which studied solid geometry did not achieve as well as the group which did not on tests of space perception abilities.

(I) study of solid geometry. (D) space perception.

a; ---; 2-s; ---; 1.4, 3.4, 4.1; gr. 12; ---; ---.

Scotland, Joseph Henry. An Analysis of Methods of Plane Curve Fitting. (New York University, 1937.) (m-3)

Shibli, Jabir. Recent Developments in the Teaching of Geometry. (Teachers College, Columbia University, 1932.)

Smith, Rolland R. Three Major Difficulties in the Learning of the Demonstrative Geometry. (Teachers College, Columbia University, 1940.)

Usiskin, Zalman Philip. The Effects of Teaching Euclidean Geometry Via Transformations on Student Achievement and Attitudes in Tenth-Grade Geometry. (The University of Michigan, 1969.) Dis. Abst. 31A: 688; Aug. 1970. (b-3, c-30)

On a standardized test, scores of students using regular texts were significantly higher than scores of those using the transformation-oriented texts.

(I) use of transformation-oriented or regular texts. (D) achievement; attitude.

e; 3.4; 1-only; 900 students (13 schools); 3.2, 3.5; gr. 10; 7 wks.; ---.

Zoll, Edward Joseph. The Relative Merits of Teaching Plane Geometry with Varying Amounts of Applications. (New York University, 1957.) Dis. Abst. 18: 971-972; Mar. 1958. (a-2)

No significant differences in achievement, transfer, or applications scores were found between groups having varying numbers of practical problems of certain geometric principles or the usual homework.

(I) use of practical problems or usual homework. (D) achievement; transfer; applications scores.

e; 3.4; 2-s, 3-m; 6 classes; 3.2; gr. 10; ---; ---.

Other References

Abeles, 1965	(a-7)
Ahmad, 1970	(d-1)
Amidon, 1959	(a-4)
Anglin, 1966	(f-2c)
Babbott, 1964	(f-2c)
Barbeau, 1969	(t-1b)
Beane, 1963	(d-5)
Beavers, 1970	(g-5)
Berger, 1962	(d-4)
Beste, 1964	(d-5)
Bezdek, 1967	(b-5)
Biddle, 1967	(d-5)
Boe, 1967	(g-7d)
Bree, 1969	(g-4)
Brinkmann, 1963	(d-5)
Brown, J. F., 1934	(b-3)
Brownman, 1938	(a-4)
Byham, 1970	(c-13)
Caldwell, 1970	(f-2c)
Callister, 1966	(e-5)
Carry, 1968	(a-4)
Coleman, 1942	(a-1)
Corley, 1959	(c-13)
Deer, 1969	(c-13)
Dennis, 1969	(d-6a)
Dixon, 1964	(d-9)
Fremont, 1964	(a-4)
Gadske, 1940	(g-4)
Geddes, 1962	(d-4)
Ginther, 1965	(d-1)
Hanna, 1965	(e-5)
Heinke, 1958	(c-30)
Henderson, 1946	(g-4)
Henry, 1933	(g-4)
Hlavaty, 1950	(c-26)
Howe, 1967	(t-1b)

Geometry course (c-23)

Hunte, 1966	(a-1)
Johnson, D. A., 1949	(d-4)
Kellogg, 1956	(a-4)
Koppenhaver, 1943	(a-4)
Kozak, 1952	(b-3)
Lazar, 1937	(c-13)
Lewis, 1950	(g-4)
Mars, 1970	(f-2c)
Martin, 1967	(t-1a)
McLean, 1960	(b-3)
Melaragno, 1967	(e-2)
Miller, 1964	(f-1a)
Morgan, 1966	(e-5)
Nichols, 1956	(a-4)
Orleans, 1931	(f-2c)
Peters, 1964	(d-5)
Platt, 1968	(c-13)
Pruitt, 1969	(a-1)
Quast, 1968	(a-1)
Rollins, 1966	(g-3)
Rushton, 1963	(g-2)
Smith, J. L., 1964	(t-1b)
Spillane, 1959	(t-2c)
Stabler, 1935	(b-3)
Stein, 1942	(e-1)
Steinbrenner, 1955	(b-3)
Stilwell, 1968	(t-2d)
Taylor, 1970	(c-30)
Turney, 1957	(d-3)
Ulmer, 1939	(g-4)
Ware, 1963	(e-3)
Wilson, 1959	(d-1)
Wolfe, 1969	(t-2d)
Wong, 1969	(t-1b)

Rosenberg, Herman. The Impact of Modern Mathematics on Trigonometry: A Study of the Significance of Certain Concepts of Higher Mathematics for the Teacher of Trigonometry. (New York University, 1955.) Dis. Abst. 15: 1796-1797; Oct. 1955. (t-2b)

Use of deductive reasoning in deriving ideas from higher mathematics to apply in trigonometry classes was proposed.

d; ---; ---; ---; ---; sec., college; ---; ---.

Szabo, Steven. Vector Trigonometry for Secondary Schools. (University of Illinois, 1969.) Dis. Abst. 30A: 2733-2734; Jan. 1970. (b-3)

Text materials for a course in analytical trigonometry using vector methods from geometry were written and adapted. The feasibility of such a course was verified in classroom trials.

d; ---; ---; ---; ---; sec.; ---; ---.

Other References

Kozak, 1952	(b-3)
Wallace, 1969	(d-6b)
Zamboni, 1969	(e-5)

Calculus course (c-25)

Pinker, Aron. An Experimental Course on the Calculus of Finite Differences. (Columbia University, 1969.) *Dis. Abst.* 30B: 2803; Dec. 1969.

The calculus course was found to be "appropriate" by students and teachers.

a; ---; 2-s; ---; ---; gr. 12; 1 yr.; ---.

Swenson, John A. A Course in the Calculus for Secondary Schools with New and Original Treatments of Many Topics Together with the Record of Seven High-School Classes in This Course. (Teachers College, Columbia University, 1931.)

Other References

Beougher, 1969	(c-26)
Brockman, 1963	(t-2b)
Isaac, 1970	(c-17)
Kozak, 1952	(b-3)
Lackner, 1969	(a-4)
Riggs, 1969	(c-30)

Beougher, Elton Earl. Relationships Between Success of Advanced Placement Mathematics Programs and Various Administrative, School and Community Factors. (The University of Michigan, 1968.) Dis. Abst. 30A: 195-196; July 1969. (c-25, e-2)

Some factors involved in successful advanced placement programs were identified: operation of calculus classes, guidance, use of outside consultant advice, SES, and, to some extent, teacher background in mathematics.

s; ---; ---; 17 schools; 2.6, 6.1; sec.; ---; norm, non-norm.

Eirich, Wayne Melvin. A Comparison of the Business Mathematics Achievement of Business Mathematics Students, Algebra Students, and General Mathematics Students. (Arizona State University, 1968.) Dis. Abst. 29A: 1036; Oct. 1968. (c-21, c-22)

Students enrolled in business mathematics achieved greater increases on a business mathematics test than did students in algebra or general mathematics courses.

(I) type of course. (D) achievement.

a; ---; 1-only; 264 students; 3.3, 3.5; gr. 9; 1 semester; norm,

non-norm.

Gamble, Harry Thomas. A Study of Business Arithmetic Achievement in Selected Grades of 9 to 12. (Temple University, 1965.) Dis. Abst. 26: 4329-4330; Feb. 1966. (c-20)

Students who began a business arithmetic course in grade 9 realized more progress in that year than students who began the course in grades 10, 11, or 12.

f; ---; 1-only; 842 students; 1.4, 1.6; grs. 9-12; 1 yr.; ---.

Hlavaty, Julius Hayman. Changing Philosophy and Content in Tenth Year Mathematics. (Columbia University, 1950.) Dis. Abst. 10: 64-65; Issue No. 3, 1950. (c-21, c-23)

A course in general mathematics, stressing methods of thinking, was proposed to replace the traditional course in demonstrative geometry.

d; ---; ---; ---; ---; gr. 10; ---; ---.

Other courses (c-26)

Linkhart, Bennie Robert. Current Patterns in Selected Advanced Placement Mathematics Programs Within the State of Arizona. (University of Arizona, 1968.) Dis. Abst. 29A: 1166; Oct. 1968. (b-3)

Teachers, principals, and students tended to agree that the Advanced Placement mathematics course should be offered in most high schools and that it was more stimulating and a greater challenge than "regular" courses.

s; ---; 2-s; 6 principals, 6 teachers, 136 high school students,

108 college students; 1.6, 2.6; gr. 12; ---; norm, non-norm.

Polishook, William M. The Effectiveness of Teaching Business Arithmetic as a Separate Subject and as an Integrated Part of Junior Business Training. (New York University, 1945.) Dis. Abst. 7: 61-63; Issue No. 2, 1947. (d-8)

Students in separate business arithmetic courses did better than those in integrated courses, but in neither case did students achieve competency.

(I) separate or integrated business arithmetic course.
(D) achievement.

a; ---; 1-only; 669 students; 1.6; gr. 9; 1 yr.; non-norm.

Other References

Kieren, 1969	(d-6b)
Long, 1969	(d-6a)
Montgomery, 1969	(b-3)
Saidel, 1[illegible]	(a-1)
Sipser, 1966	(a-4)
Spillane, 1959	(t-2c)
Tener, 1969	(a-4)
Woodby, 1952	(b-4)

Heinke, Clarence Henry. Discovery in Geometry Through the Process of Variation: Generation of New Theorems and Exercises in Geometry by Performing Certain Operations Upon Either the Data or the Conclusion, or Both of a Known Theorem or Exercise. (The Ohio State University, 1953.) Dis. Abst. 18: 886-889; Mar. 1958. (a-4, c-23)

The use of the concept of variation in plane geometry was analyzed and explored with a group of students.

a; ---; 1-only; 1 class; ---; gr. 10; ---; ---.

Hollingshead, Irving, Jr. Number Theory in the Twelfth Grade Mathematics Program. (Rutgers University, 1965.) Dis. Abst. 27A: 414; Aug. 1966. (b-3)

A course in elementary number theory was developed and informally tested.

a; ---; 1-only; 10 students; ---; gr. 12; ---; ---.

Jacobs, Claire C. The Set Theoretic Concept of Partition in School Mathematics. (Rutgers University, The State University of New Jersey, 1970.) Dis. Abst. 31A: 1139; Sept. 1970. (b-3, d-1)

Materials on partition were developed and used in a feasibility study. Analysis of textbooks revealed a large number of topics to which it could be applied.

d; ---; ---; 1 class; ---; gr. 8; ---; ---.

Pang, Paul Hau-lim. A Mathematical and Pedagogical Study of Square Root Extraction. (State University of New York at Buffalo, 1969.) Dis. Abst. 30A: 1080; Sept. 1969. (d-5)

The direct-trial method was significantly better than the traditional algorithm and the average-and-divide method.

(I) three methods of obtaining square root. (D) achievement.

e; 3.4 r; 2-s, 3-r; 315 students; ---; grs. 8, 9; 2 classes (retention, 1 wk.); non-norm.

Other topics (c-30)

Riggs, Richard Forrest. The Mean Value Theorem as a Topic for Calculus in the Ninth Grade. (Rutgers - The State University, 1968.) Dis. Abst. 29A: 2044; Jan. 1969. (c-25)

Students at grade 12 learned more from the unit on the mean value theorem than did ninth graders.

(I) study of unit. (D) achievement.

a; ---; 1-only; 7 classes (157 students); 1.6; grs. 9, 12; ---; non-norm.

Taylor, Jerry Duncan. An Experimental Approach to the Development of the Real Number System Through Cauchy Sequences. (The Florida State University, 1969.) Dis. Abst. 30B: 5602-5603; June 1970. (b-3, c-23)

A unit with a rigorous development of the real number system was reported to be feasible for above average students with a strong background in mathematics. Scores of a high school class were significantly higher than those of a college class.

(I) use of unit on real number system. (D) achievement.

e; 3.22; 2-s; 2 classes (17 sec. students, 11 college students); 4.3; analytic geometry; 10 wks.; non-norm.

Williams, John Fox. The Development of the Study of Vectors for the Secondary School. (Columbia University, 1965.) Dis. Abst. 26: 4514-4515; Feb. 1966.

It was concluded that vectors can best be used as unifying agents when taught with a linear algebra emphasis.

d; ---; ---; ---; ---; grs. 7-12; ---; ---.

Other topics (c-30)

Other References

Becker, 1967	(a-4)
Boe, 1967	(g-7d)
Buethe, 1966	(d-8)
Davis, 1968	(a-4)
Hatz, 1966	(b-3)
Johnson, 1968	(c-23)
Leaf, 1940	(f-1a)
Leskow, 1969	(g-7d)
Morgan, 1966	(e-5)
Nicely, 1970	(d-1)
Riggle, 1968	(b-3)
Scott, 1969	(d-5)
Shumway, 1970	(g-4)
Smith, 1964	(t-1b)
Sowle, 1940	(d-4)
Steinbrenner, 1955	(b-3)
Tucker, 1970	(b-2)
Usiskin, 1970	(c-23)
Williams, K. E., 1969	(d-8)
Wixson, 1970	(d-8)

Textbooks (d-1)

Ahmad, Saleh. A Comparative Study of the Changes in the Foundations and Fundamental Concepts of the Euclidean Plane Geometry. (Colorado State College, 1969.) Dis. Abst. 31B: 275-276; July 1970. (a-7, c-23)

Since 1930, textbook treatments of plane geometry have become increasingly rigorous. Textbooks used in East Pakistan were also modeled after Euclid.

d; ---; ---; ---; ---; geometry; ---; ---.

Buchalter, Barbara Diane Elpern. The Validity of Mathematics Textbook Series in Grades 7-14 with Structure as an Objective. (University of Arizona, 1968.) Dis. Abst. 30A: 198-199; July 1969. (b-3)

The presentation of structure was found more often at the two lower levels of cognitive learning (Bloom's) than at the four higher levels.

d; ---; ---; 45 textbooks; 3.2, 5.2; grs. 7-14; ---; ---.

Elbrink, Larry Craig. The Life and Works of Dr. John August Swenson, Mathematics Educator, 1880-1944. (The Ohio State University, 1969.) Dis. Abst. 30A: 2722; Jan. 1970. (m-2)

Algebra texts by Swenson published 1930-1945 included many topics in recent texts: inequalities, sets, function, proof, vectors, properties of real numbers, definition, logic, and number theory.

d; ---; ---; ---; ---; algebra; ---; ---.

Findley, Robert Earl. An Evaluation of the Effectiveness of a Textbook, Advanced General Math, Used by Ninth Grade General Mathematics Classes. (Colorado State College, 1966.) Dis. Abst. 27A: 2440-2441; Feb. 1967. (c-21, d-3)

The group using the traditional text and calculators for a full year gained significantly more than those using the traditional text alone or the modern text with calculators, only on arithmetic fundamentals achievement.

(I) use of traditional or modern text with or without calculators and flowcharts for 1/2 or full year. (D) achievement; attitude.

e; 3.12; 2-s; 6 classes; 3.2; gr. 9; 1 yr.; norm.

Ginther, John Lincoln. A Study of Definitions in High School Mathematics Textbooks. (University of Illinois, 1964.) Dis. Abst. 25: 4574; Feb. 1965. (c-22, c-23, d-9)

Connotative definitions were used most commonly, with geometry texts having a higher proportion than algebra texts. Definitions were frequently (64 per cent in algebra and 76 per cent in geometry) the same as or equivalent to SMSG definitions.

d; ---; 2-r; 23 textbooks; 1.6; grs. 9, 10; ---; ---.

Humphry, Betty Jeanne. The Development of the Work-Study Skills in Selected Elementary School Textbooks. (State University of Iowa, 1954.) Dis. Abst. 15: 1573; Sept. 1955. (c-17, d-8)

Practically all formal instruction on the use of graphs and tables was presented in mathematics textbooks, while textbooks for other areas used graphs and tables with little or no instruction.

d; ---; ---; ---; ---; grs. 3-8; ---; ---.

King, Angie Turner. An Analysis of Early Algebra Textbooks Used in the American Secondary Schools Before 1900. (University of Pittsburgh, 1955.) Dis. Abst. 15: 746-747; May 1955. (a-1, c-22)

Differences between old and more recent algebra textbooks were noted.

d; ---; ---; ---; ---; gr. 9; ---; ---.

Lohr, Charles Michael. An Investigation to Determine Characteristics of Situations in Which Discovery Techniques Are Utilized in Selected Sixth, Seventh, and Eighth Grade Mathematics Textbooks. (University of Virginia, 1968.) Dis. Abst. 29A: 3917; May 1969. (a-3)

Discovery procedures used in text materials generally dealt with development of concepts rather than operational procedures. They were located in the student's book rather than the teacher's, but did not always require a high degree of involvement nor were they always inductive.

d; ---; ---; ---; ---; grs. 6-8; ---; ---.

Textbooks (d-1)

Nelson, Leonard Doyal. Relation of Textbook Difficulty to Mathematics Achievement in Junior High School. (University of Minnesota, 1962.) Dis. Abst. 24: 203; July 1963. (d-9)

No significant differences were found on standardized tests between groups in grades 7 and 9 who used regular or simplified SMSG textbooks, but all except the highest achievers scored higher on SMSG tests when using the simplified textbook.

(I) use of SMSG regular or simplified textbooks. (D) achievement.

e; 2.1; 2-s, 3-m; 745 students (28 classes); 3.5, 6.2; grs. 7, 9;

1 yr.; norm, non-norm.

Nicely, Robert Francis. Development of Procedures for Analyzing Materials for Instruction in Complex Numbers at the Secondary Level. (University of Pittsburgh, 1970.) Dis. Abst. 31A: 2262; Nov. 1970. (b-3, c-30)

College students analyzed instructional materials in complex numbers using a content and behavior list similar to that used in the PRIMES project, and determined major similarities and differences in the materials.

d; ---; ---; 7 sets of materials (42 college students); ---; sec.;

---; ---.

Palmer, Henry Benjamin Abiodun. Indicating Essentials of Secondary School Algebra: A Comparative Analysis of British, United States and Entebbe Programs. (University of Southern California, 1967.) Dis. Abst. 28A: 4542-4543; May 1968. (a-7, c-22, d-9)

Forty-one algebraic concepts were identified as essentials. English and American test items probed for understanding more than did Entebbe items. Complex fractions should be omitted, and statistics included.

d; ---; ---; ---; ---; gr. 9; ---; ---.

Rajaratnam, Nageswari. A Study of Some Concepts in Algebra as Used by Writers of High-School Text-Books. (University of Illinois, 1957.) Dis. Abst. 18: 532-533; Feb. 1958. (a-1, c-22)

Concepts of variable, function, equation, and equality were beginning to appear in textbooks published between 1953 and 1957.

d; ---; ---; 10 textbooks; ---; ---; ---; ---.

Roberts, Gerhard Herman. A Critical Evaluation of the Presentation of First Year Algebra in Two Contemporary Courses Based on Selected Criteria from the Theory of Learning. (Columbia University, 1966.) Dis. Abst. 27A: 611; Sept. 1966. (c-22, d-9, g-4, g-6)

Criteria from reinforcement theory and Gestalt psychology were applied to SMSG and UICSM textbooks. A considerable portion of each text conformed to the criteria.

d; ---; ---; 2 textbook series; ---; gr. 9; ---; ---.

Treuenfels, Edith Sophie. Reflections of Pragmatic Philosophy in the Literature on Mathematics Teaching. (The University of Wisconsin, 1957.) Dis. Abst. 17: 2534-2535; Nov. 1957. (m-1)

Pragmatic philosophy was found to be reflected only occasionally in textbooks, with little emphasis.

d; ---; ---; ---; ---; grs. 9-12; ---; ---.

Wilson, John Donald. An Analysis of the Plane Geometry Content of Geometry Textbooks Published in the United States Before 1900. (University of Pittsburgh, 1959.) Dis. Abst. 20: 1648; Nov. 1959. (a-1, c-23)

Textbooks published between 1811 and 1899 were analyzed in terms of aims, fundamental assumptions, propositions, and student exercises; evolutionary development was noted.

d; ---; ---; ---; ---; ---; ---; ---.

Textbooks (d-1)

Other References

Abeles, 1965	(a-7)
Albrecht, 1958	(c-23)
Bell, 1970	(a-2)
Blocker, 1968	(d-8)
Brown, 1970	(a-4)
Byham, 1970	(c-13)
Dahmus, 1968	(d-9)
Dixon, 1964	(d-9)
Glaser, 1970	(c-15)
Gupta, 1967	(f-1a)
Hight, 1962	(c-17)
Hinckeley, 1950	(a-1)
Izzo, 1957	(c-17)
Jacobs, 1970	(c-30)
Kaufmann, 1969	(c-22)
Love, 1964	(c-23)
McLaughlin, 1970	(a-4)
Mock, 1959	(t-1b)
Monk, 1966	(c-22)
Myers, 1956	(c-23)
Neatrour, 1969	(c-11)
Nelson, I. I., 1932	(a-1)
Pruitt, 1969	(a-1)
Reeves, 1970	(c-17)
Rice, 1951	(d-8)
Sooy, 1970	(b-3)
Winzenread, 1970	(d-5)

Haller, Paul. Value of an Arithmetic Workbook in Teaching Arithmetic in Grades 4-8 Inclusive. (University of Indiana, 1930.)

Matlin, Sam. An Experiment with Worksheets in General Mathematics. (New York University, 1960.) Dis. Abst. 21: 1207; Nov. 1960. (c-21)

No significant differences in achievement were found between groups receiving or not receiving worksheets.

(I) use of worksheets or "regular" procedures. (D) achievement.

e; 3.4; 2-s, 3-m; 4 classes (108 students); ---; gr. 10; 1 semester;

non-norm.

Manipulative devices, games (d-3)

Anderson, George R. Visual-Tactual Devices: Their Efficacy in Teaching Area, Volume and the Pythagorean Relationship to Eighth Grade Children. (The Pennsylvania State University, 1957.) Dis. Abst. 18: 160-161; Jan. 1958. (a-6, c-8)

No significant differences were found between groups who used or did not use a kit of visual-tactual devices.

(I) use of kit of devices or no devices. (D) achievement; attitude.

e; 3.8 r; 2-s, 3-s; 408 students; ---; gr. 8; 8 wks.; non-norm.

Burgess, Ernest Edward. A Study of the Effectiveness of the Planned Usage of Mathematical Games on the Learning of Skills and Concepts and on the Attitude Toward Mathematics and the Learning of Mathematics of Low Achieving Secondary Students. (The Florida State University, 1969.) Dis. Abst. 30A: 5333-5334; June 1970. (e-2a)

The treatment involving regular use of mathematical games resulted in significantly different attitude scores, but no substantial relationships were found between attitude and achievement or ability, or between SES and achievement or attitude.

(I) use of games or activity sheets. (D) achievement; attitude.

e; 3.3; 2-s, 3-r; 24 classes (488 students); 3.5, 6.4; sec.; 8 wks.;

norm, non-norm.

Cech, Joseph Philip. The Effect the Use of Desk Calculators Has on Attitude and Achievement in Ninth-Grade General Mathematics Classes. (Indiana University, 1970.) Dis. Abst. 31A: 2784; Dec. 1970. (ERIC Document No. ED 041 757) (a-4, a-6, e-2a)

No significant differences were found between the scores of a group of low achievers who were trained to use calculators and another group, on tests of attitude and computational skills.

(I) use of calculators to check computation or only learning to operate calculators. (D) attitude; achievement in computational skills.

e; 3.3; 2-s, 3-r; 81 students; ---; gr. 9; 7 wks.; norm, non-norm.

Engel, Charles William, Jr. The Development and Evaluation of Selected Automated Instructional Devices for Aiding Culturally Deprived Students in Acquiring Basic Mathematical Skills. (Wayne State University, 1966.) Dis. Abst. 28A: 998-999; Sept. 1967. (e-2a)

Significant differences on some achievement tests favoring groups of low achievers using the automated instructional aids were found.

(I) use of automated devices. (D) achievement; attitude.

e; 3.4; 1-only; 96 students; 3.2; sec.; 10 wks.; non-norm.

Jamison, King Wells, Jr. The Effectiveness of a Variable Base Abacus for Teaching Counting in Numeration Systems Other Than Base Ten. (George Peabody College for Teachers, 1962.) Dis. Abst. 23: 3816; Apr. 1963. (c-15, d-9)

No significant differences were found among groups who were instructed only with a large abacus used by the teacher or also with smaller student-manipulated abaci or with no abacus.

(I) type of aid. (D) achievement.

e; 3.4; 2-s; 3 classes; 3.2, 3.5; gr. 7; 5 days; non-norm.

Nelson, Glenn H. An Experimental Evaluation of Two Kinds of Instructional Material in Seventh Grade Arithmetic. (University of Wisconsin, 1933.)

Shuster, Carl N. A Study of the Problems in Teaching the Slide Rule. (Teachers College, Columbia University, 1938.)

Stanford, Thomas Enos. Effects of and Teacher Evaluation of Supplementary Activities on Seventh Grade Boys' and Girls' Achievement in and Preference for Mathematics. (The University of Mississippi, 1970.) Dis. Abst. 31A: 2798-2799; Dec. 1970. (a-6)

Groups using games, or non-verbal problems, or self-selection of activities had significant increases in achievement. A local control group also showed a significant increase in achievement, while a remote control group did not.

(I) instruction with activities or regular instruction.
(D) achievement; attitude; retention.

Manipulative devices, games (d-3)

e; 3.11 r; 2-s, 3-r; 420 students; ---; gr. 7; 18 wks. (retention, 5 wks.); norm.

Turney, Billy Lawrence. An Evaluation of Selected Teaching Aids for Plane Geometry. (University of Houston, 1957.) Dis. Abst. 17: 1565-1566; July 1957. (c-23)

Use of aids in geometry was not widespread, but was recommended.

s; ---; ---; ---; ---; gr. 10; ---; ---.

Other References

Albrecht, 1958	(c-23)
Cheatham, 1970	(c-11)
Cohen, 1960	(c-23)
Ebeid, 1964	(a-4)
Findley, 1967	(d-1)
Kleckner, 1969	(a-4)
Morgan, 1947	(g-5)
Phillips, 1968	(g-7a-2)
Schippert, 1965	(a-4)
Sherer, 1968	(e-2a)

Beamish, Eric Edward. A Short Study Film for Teaching the Solution of Simple Problems in Multiplication Using the C and D Scales of the Slide Rule. (Columbia University, 1967.) Dis. Abst. 28A: 4520-4521; May 1968. (c-3c)

A film was developed which presents the procedure for multiplying two simple factors using a slide rule. Provision was made for learners to use the slide rule and answer questions as the film is used.

d; ---; ---; ---; ---; sec.; ---; ---.

Berger, Emil Joseph. An Investigation of the Effectiveness of Televised Presentations of Self-Contained Television-Adapted Lessons on Enrichment Topics in Mathematics. (University of Minnesota, 1962.) Dis. Abst. 23: 1552-1553; Nov. 1962. (c-22, c-23, e-3)

Televised enrichment lessons resulted in significantly increased achievement scores for both algebra and geometry classes. No consistent pattern was found in comparisons for level of ability by type of grouping or for type of instruction.

(I) televised or conventional instruction; ability level; homogeneous or heterogeneous grouping. (D) achievement.

e; 3.4; 1-only; 269 students (9 classes); 3.3, 3.4, 3.5; grs. 9,

10; 24 days; non-norm.

Durrance, Victor Rodney. The Effect of the Rotary Calculator on Arithmetic Achievement in Grades Six, Seven, and Eight. (George Peabody College for Teachers, 1964.) Dis. Abst. 25: 6307; May 1965. (e-1a)

Use of the calculator had no effect on achievement except for seventh grade reasoning scores, nor did it affect correction of errors.

(I) use of calculator. (D) achievement.

e; 3.3; 2-m, 3-r; 70 students; ---; grs. 6-8; 9 wks.; norm.

Audio-visual devices (d-4)

Geddes, Dorothy Clara. The Use of Television in Teaching Tenth Year Mathematics: The Effectiveness of Teaching Tenth Year Mathematics by a Combined Method of Instruction by Television and a Classroom Teacher as Compared with the Traditional Method of Instruction by a Single Classroom Teacher. (New York University, 1961.) Dis. Abst. 22: 4293; June 1962. (a-4, c-23)

No significant differences were found between the groups taught with television and those taught only by a classroom teacher.

(I) instruction by television or classroom teacher. (D) achievement; critical thinking; spatial visualization; interest.

e; 3.4; 2-s; 232 students; 3.5; gr. 10; 1 yr.; norm.

Johnson, Donovan A. An Experimental Study of the Relative Effectiveness of Certain Visual Aids in Teaching Geometry. (University of Minnesota, 1949.) (c-23)

Longbotham, Jack Henry. The Use of Blackboard-by-Wire Electronic Communication System and Programmed Materials for the Enrichment of Mathematics Teaching in Selected Texas Schools. (Texas A & M University, 1968.) Dis. Abst. 29A: 3876-3877; May 1969.

Students using the system and materials had significantly different scores from those in the control group.

a; ---; ---; ---; 3.4; sec.; 1 yr.; ---.

Mastbaum, Sol. A Study of the Relative Effectiveness of Electric Calculators or Computational Skills Kits in the Teaching of Mathematics. (University of Minnesota, 1969.) Dis. Abst. 30A: 2422-2423; Dec. 1969. (e-2b)

Students learned to use the calculator to solve one-step computation problems, but this ability did not transfer to non-calculator situations. Neither achievement nor attitude were significantly improved.

(I) use of textbook, calculator, and/or skills kits. (D) achievement.

e; 3.3; 2-s, 3-r; 171 students; 3.2, 3.3, 3.5; grs. 7, 8; ---; norm.

Montelbana, Dominick. The Production and Experimental Evaluation by the Teacher of a Series of 16mm Silent Films for Teaching Mathematics in Grade 7A as Outlined in the Syllabus for the New York City Junior High Schools. (New York University, 1942.)

Robinson, Frank Edward. An Analysis of the Effects of Tape-Recorded Instruction on Arithmetic Performance of Seventh Grade Pupils with Varying Abilities. (North Texas State University, 1968.) Dis. Abst. 29A: 3782; May 1969. (f-2b)

Those who received traditional instruction performed at a higher rate than those who received tape instruction.

(I) tape-recorded or traditional instruction; ability.
(D) achievement.

e; 3.3; 2-s, 3-r; 367 students; 3.4; gr. 7; 8 wks.; non-norm.

Sekyra, Francis, III. The Effects of Taped Instruction on Problem-Solving Skills of Seventh Grade Children. (University of Alabama, 1968.) Dis. Abst. 29A: 3473-3474; Apr. 1969. (a-5b)

Practice in problem solving using taped programs resulted in significant improvement in ability to extract and retrieve information, combine operations, and give correct responses.

(I) tape-recorded instruction. (D) achievement.

e; 3.18; 2-r; 36 students; ---; gr. 7; 6 days; ---.

Sowle, Wesley Atwood. The Integration of Materials of Instruction and Testing of Outcomes in Business Arithmetic. (University of Pittsburgh, 1940.) (c-30)

Warner, John Ward. The National Defense Education Act of 1958 and Its Implications for the Teaching of Mathematics in Ohio. (The Ohio State University, 1964.) Dis. Abst. 25: 6418; May 1965. (a-1)

Analysis of survey data strongly suggested that NDEA projects improved the teaching of mathematics in Ohio.

s; ---; 1-only; ---; ---; grs. K-12; ---; ---.

Audio-visual devices (d-4)

Other References

Byrkit, 1968	(t-2b)
Tiemens, 1963	(g-5)
Wells, 1960	(a-4)

Ashbaugh, William Hatch. The Effect Upon Achievement of Written Responses to Programed Learning Material for Students of Differing Academic Ability. (The Pennsylvania State University, 1962.) Dis. Abst. 23: 3987; Apr. 1963.

No significant differences in achievement were found between students who answered covertly or overtly, although the covert response took significantly less time.

(I) covert or overt responses. (D) achievement.

e; 3.4; 1-only; 358 students; 3.5, 6.1; jr. high; ---; ---.

Beane, Donald Gene. A Comparison of Linear and Branching Techniques of Programed Instruction in Plane Geometry. (University of Illinois, 1962.) Dis. Abst. 23: 4252-4253; May 1963. (c-23)

No significant differences were found between groups using programs requiring multiple choice or constructed responses or any achievement or attitude measures, though those with high ability did significantly better than those with low ability.

(I) programs requiring multiple choice or constructed responses.
(D) achievement; retention; attitude; preference; time; efficiency scores.

e; 3.16 r; 2-s; 3 classes; 3.2; gr. 10; ---; non-norm.

Belcastro, Frank P. Programmed Learning: Relative Effectiveness of Four Techniques of Programming the Addition and Subtraction Axioms of Algebra. (University of Pittsburgh, 1961.) Dis. Abst. 23: 917-918; Sept. 1962. (c-22)

The verbal deductive technique was found to be superior to the non-verbal deductive and two inductive techniques on achievement and application measures. The deductive method and the verbal mode each resulted in greater retention.

(I) verbal/non-verbal and inductive/deductive techniques.
(D) achievement; retention.

e; 3.12 r; 2-s; 5 groups; ---; gr. 8; 3 days; ---.

Programmed instruction (d-5)

Beste, Celestine A. A Critical Appraisal of Programmed Learning in Relationship to Secondary School Geometry. (The Catholic University of America, 1963.) Dis. Abst. 24: 4048; Apr. 1964. (c-23)

Conclusions about the efficacy of programmed learning are drawn from a historical study of geometry and from research on programmed learning.

d; ---; ---; ---; ---; sec.; ---; ---.

Biddle, John Charles. Effectiveness of Two Methods of Instruction of High School Geometry on Achievement, Retention, and Problem Solving Ability. (Indiana University, 1966.) Dis. Abst. 27A: 3356; Apr. 1967. (c-23)

No significant differences in achievement, retention, or transfer scores were found between groups using programmed or conventional texts; those using the programmed text generally had lower mean scores.

(I) use of programmed or conventional texts. (D) achievement; transfer; retention.

e; 3.16 r; 2-s, 3-m; ---; ---; gr. 10; 1 yr.; norm, non-norm.

Brinkmann, Erwin Henry. Educability in Visualization of Objects in Space: A Programmed Instruction Approach. (The University of Michigan, 1963.) Dis. Abst. 24: 2355-2356; Dec. 1963. (c-23)

Students using the program on perception of visual space relations made significantly greater gains in geometrical concepts and space relations than did those who did not use the program. Average students made the greatest gain in space relations. Attitude and performance were positively related.

(I) use of program on space relations. (D) achievement; attitude.

e; 2.2; 2-s, 3-m; 54 students; ---; gr. 8; ---; non-norm.

Chapel, Dewey Elbert. The Relationship of a Programmed Study Skills Unit to the Academic Achievement of a Selected Group of Eighth Grade Students. (North Texas State University, 1965.) Dis. Abst. 26: 3694; Jan. 1966.

The group using the programmed text made significant gains in arithmetic achievement compared with the group receiving no instruction in study skills.

(I) conventional text, programmed text, or no instruction on study skills. (D) achievement.

e; 2.12; 2-s, 3-r; 225 students; 3.2; gr. 8; 1 yr.; norm.

Davis, Floyd Wayne. A Study of Three Methods of Utilizing Programed Algebra Textbooks. (University of California, Berkeley, 1966.) Dis. Abst. 27A: 2272-2273; Feb. 1967. (c-22)

No significant differences were found between groups using programs with or without lectures and supplementary materials.

(I) use of programmed texts only, programs with lectures, or programs with lectures and supplementary materials. (D) achievement; attitudes.

e; 3.12; 1-only; 8 classes (196 students); 3.2, 3.5, 6.2, 6.3; gr.

9; ---; norm.

Dessart, Donald Joseph. A Study of Programmed Learning with Superior Eighth Grade Students. (University of Maryland, 1961.) Dis. Abst. 24: 1499-1500; Oct. 1963. (c-17, d-9)

The students were able to achieve satisfactory understanding of certain aspects of convergence and divergence of infinite series, with the linear programs "considered superior in a compromise of post-test and time criteria".

(I) use of six variations with a programmed unit. (D) achievement.

e; 2.12; 2-s, 3-r; 80 students; 3.2, 3.5, 3.20; gr. 8; 6 days;

norm, non-norm.

Programmed instruction (d-5)

Devine, Donald F. Student Attitudes and Achievement: A Comparison Between the Effects of Programed Instruction and Conventional Classroom Approach in Teaching Algebra I at Rich Township High Schools. (Colorado State College, 1967.) Dis. Abst. 28A: 535; Aug. 1967. (a-6, c-22)

Students of an experienced teacher scored lower when using programmed materials than when having conventional instruction; no significant differences were found between groups with an inexperienced teacher, but attitudes declined.

(I) programmed or conventional instruction. (D) achievement; attitude.

e; 3.27; 2-r, 3-s; 4 classes; 3.2, 3.3; gr. 9; 1 yr.; non-norm.

Eigen, Lewis David. An Investigation of Some Variables Affecting the Use of Programmed Instruction in Mathematics Education. (Columbia University, 1964.) Dis. Abst. 25: 289; July 1964. (c-12, c-17)

No differences were found between groups using programmed texts or teaching machines to study elements of sets, functions, and relations.

(I) use of programmed texts or teaching machines. (D) achievement, transfer, attitude, time scores.

e; 3.4; 2-s, 3-r; 77 boys; ---; grs. 10-12; ---; non-norm.

Fejfar, James Lawrence. Inductive Programming - The Exposition of a Theoretical Model, and a Description of the Development and Trial of an Exemplar Based on That Model. (University of Illinois, 1963.) Dis. Abst. 24: 3639-3640; Mar. 1964. (a-4, c-16)

Students learned from the programmed textbook which used an induction method, but revision was indicated.

(I) use of programmed text on probability. (D) achievement.

a; ---; 2-s; 35 students; ---; gr. 8; ---; ---.

Fishell, Kenneth Nelson. Utilization Patterns of Programmed Materials in the Junior High School. (The University of Rochester, 1964.) Dis. Abst. 25: 2881-2882; Nov. 1964.

In five studies a combined teacher-program type of instruction produced significantly greater student achievement than did either conventional or programmed instruction alone.

(I) use of programmed instruction. (D) achievement; attitude.

e; ---; 1-only; 5 groups; ---; grs. 7-9; ---; ---.

Johnston, Arden Eugene. Audio-Tutorial Versus Traditional Instruction in Seventh Grade Mathematics in the Boone Junior High School. (Iowa State University, 1969.) Dis. Abst. 30A: 954; Sept. 1969.

No significant differences between the two methods were found.

(I) audio-tutorial or traditional instruction. (D) achievement.

e; 3.4; 1-only; 139 students; 3.4; gr. 7; 1 semester; ---.

Meadowcroft, Bruce Allen. An Experiment with Programmed Materials in Seventh Grade Arithmetic. (University of Pittsburgh, 1964.) Dis. Abst. 26: 1514-1515; Sept. 1965.

No significant differences in achievement or attitude were found between groups having programmed or conventional instruction. Programmed instruction appeared better for average students and conventional instruction resulted in greater achievement for superior students.

(I) textbook-lecture or programmed-supplemented instruction.
(D) achievement; attitude.

e; 3.4; 2-s, 3-r; 294 students; 3.4, 6.4; gr. 7; 1 yr.; norm, nonnorm.

Programmed instruction (d-5)

Moses, John Irvin. A Comparison of the Results of Achievement with Programmed Learning and Traditional Classroom Techniques in First Year Algebra at Spring Branch Junior High School. (University of Houston, 1962.) Dis. Abst. 23: 1559-1560; Nov. 1962. (c-22)

Programmed instruction in algebra was more effective than traditional instruction for those of high ability, but might be disadvantageous for the slow learner.

(I) programmed or traditional instruction; IQ. (D) achievement.

e; 3.4; 1-only; 2 groups; ---; gr. 9; 1 yr.; norm, non-norm.

Nelson, Charles Warren. A Comparison of Three Programing Techniques for the Development of the Concept of Mathematical Induction with Eighth Grade Students. (University of Maryland, 1962.) Dis. Abst. 23: 1627; Nov. 1962. (c-13, d-9)

No significant differences in posttest or retention test means were found among groups using three programs which varied in type of response and sequence.

(I) constructed or multiple choice response; fixed or variable sequence. (D) achievement; retention.

e; 2.8 r; 2-s, 3-r; 3 classes; 3.2, 3.5; gr. 8; 6 days (retention,

2 wks.); norm, non-norm.

Newmark, Gerald. The Relationship Between Student Characteristics and Work Rate and Between Work Rate and Performance in Programmed Instruction with Two Different Subject Matter Fields. (University of Southern California, 1970.) Dis. Abst. 31A: 1146; Sept. 1970. (f-2b)

Work rates varied considerably within IQ groups, with no significant differences in achievement between low IQ pupils who worked fast and those who worked slowly.

(I) self-paced program; IQ; grades; interest; confidence.
(D) work rate; errors, achievement.

r; ---; 1-only; 4 classes (118 students); 3.2, 6.2, 6.4; gr. 8;

---; ---.

Oates, Stanton Caltham. A Study Comparing the Auto-Elucidative Method with a Linear Program. (University of Southern California, 1966.) Dis. Abst. 27A: 998; Oct. 1966. (c-15)

No significant differences were found between use of linear or "auto-elucidative" programs in binary arithmetic on effectiveness, time, or retention measures. High ability students required less time and scored higher.

(I) linear or auto-elucidative program. (D) achievement; retention; time.

e; 3.3 r; 2-s, 3-r; 328 students; 3.2, 6.4; jr. high; 6 days; norm,

non-norm.

Peters, Glenn Eugene. An Analysis of Factors for Effective Learning in an Auto-Instructional Program in Space Perception. (The University of New Mexico, 1963.) Dis. Abst. 24: 3234-3235; Feb. 1964. (c-23)

The linear branching program resulted in higher scores and lower error rate for a difficult program on space perception. No conclusive results were found about the interaction of step size and aptitude.

(I) large or small step or linear branching program; aptitude level. (D) achievement; time; error rate.

a; ---; 2-s, 3-s; 36 students (1 class); ---; gr. 10; ---; norm.

Rafiq, Razia. A Scientific Evaluation of the Unit "Relations and Functions" in Three Algebra Programmed Textbooks in Terms of Educational Objectives. (Indiana University, 1964.) Dis. Abst. 25: 4581; Feb. 1965. (a-5i, c-22)

The programmed text rated best by teachers yielded best results in student achievement.

(I) three published programmed textbooks. (D) achievement; attitude.

a; ---; 2-s, 3-m; 1 class; ---; gr. 11; ---; ---.

Programmed instruction (d-5)

Robson, Allen Maynard. A Comparative Study of the Teaching of First Year Algebra. (Oklahoma State University, 1965.) Dis. Abst. 27A: 85; July 1966. (c-22)

The groups taught by conventional instruction made significantly greater achievement than the group using programmed materials. No significant changes in attitude were found.

(I) use of programmed or conventional instruction. (D) achievement; attitude.

e; 3.3; 2-s, 3-r; 3 classes; ---; gr. 9; 1 semester; norm, non-norm.

Salisbury, Robert Gardner. A Study of Programmed Instruction in Selected Secondary Schools of Ohio. (Western Reserve University, 1965.) Dis. Abst. 27A: 712; Sept. 1966.

Schools surveyed planned to continue using programmed instruction, though achievement results were not superior to conventional instruction and enthusiasm was not high.

s; ---; 2-s; 40 principals, 60 teachers, 4,371 students; ---;

grs. 7-12; ---; ---.

Scott, Roger Owen. Mathetic and Progressive Chain Strategies for Instructional Sequencing. (The University of Michigan, 1968.) Dis. Abst. 30A: 593; Aug. 1969. (c-30, g-4)

Students viewed more favorably the progressive order chain program on square roots, though those who were highly reinforced by mathematical tasks liked both programs.

(I) mathetic or progressive chaining sequences; reinforcement value of mathematics task. (D) achievement.

e; 3.8; 1-only; 68 students; ---; sec., college; ---; non-norm.

Tanner, Glenda Lou. A Comparative Study of the Efficacy of Programmed Instruction with Seventh Grade Low Achievers in Arithmetic. (University of Georgia, 1965.) Dis. Abst. 26: 6458-6459; May 1966. (e-2a)

No significant difference was found in gains in arithmetic fundamentals made by groups taught by programmed instruction or conventional procedures, while conventional groups made greater gains in arithmetic reasoning and problems. Students liked programmed instruction better than regular instruction, but liked it better during the first month than during the last month.

(I) programmed or conventional instruction. (D) achievement; attitude.

e; 3.4; 2-s, 3-s; 179 students; 2.6, 3.5; gr. 7; 1 semester;

norm, non-norm.

Treffinger, Donald John. The Effects of Programmed Instruction in Productive Thinking on Verbal Creativity and Problem Solving Among Pupils in Grades Four, Five, Six, and Seven. (Cornell University, 1969.) Dis. Abst. 30A: 1031; Sept. 1969. (a-5b, g-4)

The instructional treatment did not significantly affect scores on an arithmetic problem solving test.

(I) use of program. (D) achievement; creativity.

e; 3.3; 2-s, 3-r; 370 students (16 classes); 3.3, 6.4; grs. 4-7;

---; non-norm.

Wiebe, Arthur John. The Comparative Effects of Three Methods of Utilizing Programmed Mathematics Materials with Low-Achievers. (Stanford University, 1966.) Dis. Abst. 27A: 1002-1003; Oct. 1966. (c-21, e-2a, g-6)

Students taught by the teacher plus programmed instruction with immediate reinforcement achieved significantly more than a similarly taught group receiving delayed reinforcement or a group using only programmed instruction with immediate reinforcement.

(I) use of programmed instruction with immediate reinforcement or teacher-plus-programmed instruction with immediate or delayed reinforcement. (D) achievement; retention.

e; 2.12 r; 2-s, 3-r; 264 students; 3.2; gr. 9; 5 days; ---.

Winzenread, Marvin Russell. Consumable Materials: A Quasi-Programmed Procedure Experimentally Tested in the Inner-City Junior High School Mathematics Classroom. (Indiana University, 1969.) Dis. Abst. 30A: 4343; Apr. 1970. (d-1, e-7)

Eighth grade classes using consumable materials with a quasi-programmed teaching procedure gained significantly more than the control group only in computation and attitude. Seventh grade groups using regular textbooks gained significantly more in achievement of concepts than those using consumable materials.

(I) quasi-programmed materials or textbooks. (D) achievement.

e; 3.4; 1-only; 40 classes, 3.5; grs. 7, 8; 1 semester; non-norm.

Wriggle, Lawrence Kay. The Amount and Nature of a Teacher Help Necessary for Optimum Achievement Through Use of Programed Learning Devices. (Washington State University, 1964.) Dis. Abst. 25: 5802-5803; Apr. 1965.

One group using programmed instruction supplemented by the teacher with review questions achieved significantly higher than those having other programmed instruction procedures or regular instruction.

(I) use of regular or programmed instruction with four types of teacher involvement. (D) achievement.

e; ---; 2-s; 10 classes; 3.2, 3.5; gr. 9; ---; ---.

Programmed instruction (d-5)

Other References

Becker, 1967	(a-4)
Behr, 1967	(g-4)
Blair, 1964	(a-4)
Bobier, 1964	(e-1b)
Buethe, 1966	(d-8)
Callister, 1966	(e-5)
Carry, 1968	(a-4)
D'Augustine, 1964	(c-11)
Davis, J. B., Jr., 1968	(a-4)
Dean, 1968	(a-5f)
Eldredge, 1966	(a-4)
Ferderbar, 1965	(a-6)
Hale, 1965	(c-13)
Hanson, 1967	(a-4)
Holtan, 1963	(g-5)
Jenkins, 1968	(e-2c)
Johnson, D. C., 1966	(a-4)
Johnson, G. F., 1967	(e-2c)
Lackner, 1969	(a-4)
MacPherson, 1967	(e-5)
Meconi, 1967	(g-4)
Morgan, 1966	(e-5)
Neuhouser, 1965	(a-4)
Ottina, 1964	(g-6a)
Pang, 1969	(c-30)
Patterson, 1970	(a-4)
Retzer, 1967	(c-13)
Rollins, 1966	(g-3)
Roughead, 1967	(a-4)
Rushton, 1963	(g-2)
Scott, A. W., 1970	(e-1b)
Todd, 1966	(t-2b)
Wolfe, 1963	(a-4)

Computer-aided instruction (d-6)

[No dissertations were assigned to this category.]

Dennis, John Richard. Teaching Selected Geometry Topics Via a Computer System. (University of Illinois, 1968.) Dis. Abst. 29A: 2145; Jan. 1969. (c-23)

Students "were able to acquire knowledge" about properties of triangles and quadrilaterals from a CAI program which allowed students to draw and verify figures.

a; ---; 1-only; 30 students; ---; jr. high; 15 days; ---.

Long, Harvey Shenk. A Determination of the Relation of the Total Time for Course Completion to the Duration of the Study Interval in Teaching Via Computer Assisted Instruction. (New York University, 1969.) Dis. Abst. 30A: 2422; Dec. 1969. (c-26)

The time required to complete a CAI program on computer programming was not affected by length of the study interval. Achievement was related to total time on the course.

(I) 50 or 100 minutes per day of CAI. (D) achievement; attitude.

e; 2.4; 2-s, 3-r; 138 students; ---; ages 16-30; ---; ---.

Other References

Melaragno, 1967	(e-2)
Ottina, 1964	(g-6a)
Shaw, 1968	(a-5a)

Non-tutorial (d-6b)

Hatfield, Larry Lee. Computer-Assisted Mathematics: An Investigation of the Effectiveness of the Computer Used as a Tool to Learn Mathematics. (University of Minnesota, 1969.) Dis. Abst. 30: 4329-4330; Apr. 1970. (b-3)

During the first year, significant differences were found between groups who used computer-programming and those who did not on only one of 11 criterion tests. Learning of BASIC programming language seemed to interfere with concurrent study of numeration systems. During the second year, significant differences favoring the computer group were found on three of 12 tests, with high and average achievers especially favored. The number theory unit seemed particularly relevant for computer use.

(I) use of computer programming or only conventional procedures; previous achievement. (D) achievement difference scores.

e; 3.7; 2-s, 3-r; ---; 1.7, 3.2; gr. 7; 2 yrs.; norm, non-norm.

Kieren, Thomas Ervin. The Computer as a Teaching Aid for Eleventh Grade Mathematics: A Comparison Study. (University of Minnesota, 1968.) Dis. Abst. 29A: 3526-3527; Apr. 1969. (c-26)

Mean achievement of the group having computer programming tended to be higher, especially for average students.

(I) instruction with or without computer programming.
(D) achievement.

e; 3.3; 2-s, 3-r; 81 students; 3.2, 3.5; gr. 11; 2 yrs.; norm, non-norm.

Wallace, David Campbell. The Impact of Computer Mathematics on the Learning of High School Trigonometry and Physics. (The University of Texas at Austin, 1968.) Dis. Abst. 29A: 3540; Apr. 1969. (c-24, d-8)

Students who had a review of trigonometry using flow charting and elementary computer techniques gained significantly more than those who had trigonometry with or without a computer mathematics course first.

(I) trigonometry taught conventionally, following computer mathematics, or with computer programming. (D) achievement.

e; 3.4; 1-only; 3 classes; ---; grs. 11, 12; 1 semester; ---.

Washburne, Robert Miles. CEMP - A Computer Enriched Mathematics Program. (Cornell University, 1969.) Dis. Abst. 30A: 5179; June 1970. (p-2)

The writing, execution, and correction of computer programs (using CUPL) was found to strengthen understanding of mathematical concepts and result in a strong positive attitude at each of the grade levels studied. Although high-IQ students tended to derive greater benefit, average- and low-IQ students also benefited.

(I) coordinating computer programming exercises with mathematical topics or conventional assignments. (D) understanding; attitude.

e; 3.4; 1-only; 10 classes; ---; grs. 7, 8, 12, college freshmen;

---; ---.

Other Reference

West, 1970 (f-1a)

Readability and vocabulary (d-7)

Curry, John Foster. The Effect of Reading Instruction Upon Achievement in Seventh-Grade Arithmetic. (Indiana University, 1955.) Dis. Abst. 15: 2059; Nov. 1955.

No significant differences were found in mathematics or reading scores between groups which had or did not have specific reading instruction.

(I) reading and mathematics terminology instruction. (D) achievement.

e; 3.4; 1-only; 132 students; 3.4; gr. 7; ---; norm.

Drake, Richard M. The Effect of Instruction in the Vocabulary of Algebra Upon Achievement in 9th Grade Mathematics. (University of Minnesota, 1938.) (c-22)

Eagle, Edwin. The Relationship of Certain Reading Abilities to Success in Mathematics at the Ninth Grade Level. (Stanford University, 1947.)

Hater, Sister Mary Ann. The Cloze Procedure as a Measure of the Reading Comprehensibility and Difficulty of Mathematical English. (Purdue University, 1969.) Dis. Abst. 30A: 4829; May 1970.

Cloze tests were found to be high reliable measures and valid predictors of reading difficulty, with a correlation of .69 with comprehension test scores.

s; ---; ---; 1,717 students; ---; grs. 7-10; ---; ---.

Hemphill, Samuel Reid. Improving Linguistic Ability as a Factor in Solving Problems in Algebra. (University of Kansas, 1941.) (c-22)

McKim, Margaret G. The Reading of Verbal Material in Ninth Grade Algebra. (Columbia University, 1942.) (c-22)

Mermelstein, Jacob. An Investigation Concerning the Meaning of Synonyms and Antonyms of Words Denoting Time, Size and Amount for Children and Adults. (Rutgers - The State University, 1964.) Dis. Abst. 25: 3102; Nov. 1964. (c-8, p-1)

Significant differences were found between children and adults concerning the meaning of the words studied. Children consistently attached more extreme values to individual words.

s; ---; 1-only; 150 students, 75 college students; ---; grs. 2, 5,

8, college; ---; ---.

Troxel, Vernon Earl. Reading Eighth Grade Mathematical Materials for Selected Purposes. (University of Illinois, 1959.) Dis. Abst. 20: 168-169; July 1959.

Ability to read mathematical materials appeared related to general reading ability. Practice without instruction did not result in better speed and comprehension scores.

a; ---; 2-s, 2 classes (45 students); ---; gr. 8; 20 days; non-norm.

Quantitative concepts in other curricular areas (d-8)

Abeles, Sigmund. The Utilization of Certain Mathematical Skills in the Solution of Selected Problems in Physics: A Comparison of the Ability of Selected Groups of Physical Science Study Committee Physics Students and New York State Regents Physics Students to Solve Problems in Physics Involving the Use of Mathematical Skills. (New York University, 1966.) Dis. Abst. 27A: 2435-2436; Feb. 1967.

Significant correlations were found between physics students' mastery of specified mathematical skills and their ability to solve physics problems involving these skills.

f; ---; 1-only; 700 students; 3.4, 3.5; gr. 11; ---; norm.

Ackerson, Paul Berndt. A Study of the Relationship Between Achievement in PSSC Physics and Experience in Recently Developed Courses in Science and Mathematics. (Oklahoma State University, 1965.) Dis. Abst. 27A: 44; July 1966. (ERIC Document No. ED 013 756) (d-9)

There was a tendency for students with experience in SMSG mathematics to achieve at a higher level in PSSC physics than did non-SMSG students.

f; ---; 1-only; 25 classes; 3.5; gr. 11; ---; norm.

Bedwell, Thomas Howard. A Critical Analysis of the Physical Science and Supporting Mathematics Instruction in the Secondary Schools of South Dakota. (The University of Nebraska, 1966.) Dis. Abst. 27A: 1696-1697; Dec. 1966. (ERIC Document No. ED 019 211) (a-1)

Enrollment in mathematics classes increased three times as much as total school enrollment (1953-1963). No radical changes were found in methods of instruction. Mathematics scores were found to be the best predictors of class rank.

s; 2-s; ---; 1,100 students; 3.2, 3.5, 3.13, 6.4; sec.; ---; norm, non-norm.

Blocker, Richard Daniel, Jr. Religious Content in State-Approved Textbooks Used in American Public Secondary Schools in the Fields of Language Arts, Mathematics, Science, and Social Studies During the Year 1966. (The American University, 1968.) Dis. Abst. 29A: 1144-1145; Oct. 1968. (d-1)

Theistic religion was articulated in word and picture symbols to a greater extent in language arts and social studies textbooks than in mathematics and science textbooks.

d; ---; ---; ---; ---; sec.; ---; ---.

Buethe, Lorain Chris. A Feasibility Study of Unit and Dimensional Analysis in High School. (The University of Nebraska, Teachers College, 1965.) Dis. Abst. 26: 5903-5904; Apr. 1966. (c-22, c-30, d-5)

It was concluded that teaching high school students unit and dimensional analysis by means of the programs used in this study was not feasible. (Algebra students who had not studied physics were unable to state physics formulas or solve physics problems.)

(I) conventional or dimensional analysis procedures. (D) achievement.

e; 3.16; 2-s, 3-r; 357 students; 3.2; high school; 3 days; non-norm.

Cain, Ralph Winston. An Analysis of the Achievement of Students in Selected High School Biology Programs in Relation to Their Mathematical Aptitude and Achievement. (The University of Texas, 1964.) Dis. Abst. 25: 5149-5150; Mar. 1965.

A few significant relationships were found between mathematical achievement and aptitude and biology achievement.

r; ---; 2-s; 1,090 students; 6.4; gr. 10; ---; ---.

Carter, William Ray. A Study of Certain Mathematical Abilities in High-School Physics. (University of Missouri, 1931.)

Quantitative concepts in
other curricular areas (d-8)

Case, James Burnell. Treating Chemical Equilibrium Mathematically in Secondary Schools: A Preliminary Investigation. (The University of Toledo, 1968.) Dis. Abst. 29A: 2601-2602; Feb. 1969.

Characteristics of chemistry students who were successful in grasping the mathematical approach to chemical equilibrium were determined.

a; ---; 1-only; 1 school; ---; chemistry; 7 days; ---.

Clewell, Willard Stanley, Jr. A Study of the Effects of Teaching Intermediate Algebra and Chemistry as an Integrated Program in the Eleventh Grade. (Lehigh University, 1964.) Dis. Abst. 25: 7106; June 1965. (a-2, c-22)

No significant difference between the achievement of students who were taught algebra and chemistry in an integrated program or separately was found.

a; ---; 1-only; 2 classes; 3.3, 3.4, 6.2; gr. 11; ---; norm, non-

norm.

Glismann, Leonard W. The Effects of Special Arts and Crafts Activities on Attitudes, Attendance, Citizenship, and Academic Achievement of Slow Learning Ninth Grade Pupils. (Utah State University, 1967.) Dis. Abst. 29A: 1163; Oct. 1968. (e-2b)

Groups given a special arts and crafts program made significant gains in mathematics achievement.

(I) special arts and crafts activities. (D) achievement; attitude.

e; 3.4; 2-s, 3-s; 5 classes; ---; gr. 9; 1 yr.; non-norm.

Hellmich, Eugene W. Mathematics in Certain Social Studies in Secondary Schools and Colleges. (Teachers College, Columbia University, 1935.)

Higgins, Jon Lyle. The Development and Evaluation of Mathematics Curriculum Materials for Use in a Junior High School Physical Science Program. (The University of Texas, 1967.) Dis. Abst. 28A: 1620; Nov. 1967. (ERIC Document No. ED 023 570) (b-3, c-7, c-8)

In general, the use of mathematical applications in physical science classes resulted in significantly higher achievement on selected mathematical concepts for students of average and low-ability groups.

(I) physical science taught with or without mathematical applications. (D) achievement.

e; 3.4; 1-only; 48 classes (926 students); 3.2; gr. 9; ---; norm, non-norm.

Jenkins, Thomas Vinnedge. A Study of the Relationship Between Music Aptitudes and Mental Ability, Science Aptitudes, and Mathematics Aptitudes Among Secondary School Pupils in Texas. (The University of Texas, 1960.) Dis. Abst. 21: 2592; Mar. 1961.

Correlations ranging from .37 to .46 were found between mathematics and music tests.

r; ---; 2-s; 256 students; 6.4; sec.; ---; norm.

Kohler, Emmett Theodore. An Investigation of Cloze Scores in Terms of Selected Cognitive Variables. (The Florida State University, 1966.) Dis. Abst. 27A: 114-115; July 1966. (f-2)

An addition test was presumed to represent a speed factor for students using cloze tests on science and history material.

r; ---; ---; 257 students; 3.13, 6.1; gr. 10; ---; norm.

Legere, C. L. John. An Investigation of Time Relationship Understandings in Grades Four Through Eight. (Boston University School of Education, 1962.) Dis. Abst. 23: 1625; Nov. 1962. (c-8)

The mathematical factor was apparently used earliest in developing understanding of time relationships.

s; ---; 1-only; 875 students; ---; grs. 4-8; ---; non-norm.

Quantitative concepts in other curricular areas (d-8)

Murphy, William Carl. A Study of the Relationships Between Listening Ability and High School Grades in Four Major Academic Areas. (University of Alabama, 1962.) Dis. Abst. 23: 3693; Apr. 1963.

The correlation of mathematics grades and listening ability score was .57 for boys, .47 for girls, and .49 for the total group. Correlations for English, social studies, and science were also significant.

r; ---; ---; 317 students; 6.4; gr. 12; ---; ---.

O'Neil, Thomas. Mathematics Ability as an Index of Success in Science. (Fordham University, 1931.)

Rice, Hugh Smith. Mathematical Geography in American School Textbooks. (Columbia University, 1950.) Dis. Abst. 11: 601-602; Issue No. 3, 1951. (d-1)

On the average, half the space in astronomy books was given to mathematical geography, with other types of books averaging less.

d; ---; ---; ---; ---; sec.; ---; ---.

Root, Paul Ray. Speed Reading: Its Relation to High School Achievement in English, History, Mathematics, and Science in Hot Springs, Arkansas. (University of Arkansas, 1964.) Dis. Abst. 25: 1791-1792; Sept. 1964.

A speed reading program had no significant effect on mathematics grades.

(I) course in speed reading. (D) mathematics grades.

r; ---; 1-only; ---; ---; sec.; 6 wks.; ---.

Sharo, Ernest Adam. Physics, Mathematics, and Visual Spatial Relations: An Investigation of Aptitude in the Formation of Mental Concepts of Visual Spatial Relations as a Partial Index of Academic Achievement in High School Physics and Mathematics. (New York University, 1962.) Dis. Abst. 23: 1291; Oct. 1962.

A significant correlation was found between visual spatial relations and mathematics achievement scores, but not between verbal and mathematics test scores.

r; ---; 1-only; 60 high school students, 174 grad. students, 64 scientists; 3.4, 6.4; ---; ---; norm, non-norm.

Williams, Kenneth Edwin. The Feasibility of the Use of Dimensional and Unit Analysis in Junior High School Science Instruction. (Indiana University, 1968.) *Dis. Abst.* 30A: 77; July 1969. (c-30)

Use of unit and dimensional analysis in solving science problems was found to aid students with average and higher mental and mathematical ability.

(I) unit on dimensional and unit analysis; mathematical ability level. (D) achievement in physics.

e; ---; 2-s, 3-r; 160 students; 3.2; gr. 8; 5 days; norm, non-norm.

Wixson, Eldwin Atwell, Jr. The Effects of a Mathematical Approach to Teaching Two Topics in High School Biology on Student Achievement and Attitudes. (The University of Michigan, 1969.) *Dis. Abst.* 31A: 1157; Sept. 1970. (b-3, c-30)

Use of graphing techniques and a binomial model of probability was more effective when used with the BSCS curriculum than with another textbook.

(I) biology materials using a mathematical approach with BSCS or regular texts. (D) mathematics transfer; biology achievement; attitude; algebra readiness.

e; 3.4; 2-s; 8 classes (120 students); 3.2, 3.5; biology; ---; non-norm.

Other References

Humphry, 1955	(d-1)	Polishook, 1947	(c-26)
McFee, 1968	(c-8)	Wallace, 1969	(d-6b)
Myrick, 1970	(a-2)		

Developmental projects (d-9)

Crespy, H. Victor. A Study of Curriculum Development in School Mathematics by National Groups, 1950-1966: Selected Programs. (Temple University, 1969.) Dis. Abst. 31A: 923-924; Sept. 1970. (b-3)

Twenty-four projects were analyzed on factors such as impetus for origin, premises, content, materials developed, evaluation, and teacher training, with two (GCMP, UICSM) studied in detail.

d; ---; ---; 24 programs; ---; grs. K-12; ---; ---.

Dahmus, Maurice. The Lack of Uniformity in the Algebra I Texts Produced by the Ball State, Southern Illinois, SMSG, and UICSM Modern Mathematics Projects. (University of Arkansas, 1968.) Dis. Abst. 29A: 181-182; July 1968. (c-22, d-1)

Wide diversity was found in the terminology, symbols, expressions, and content of algebra texts from four projects.

d; ---; ---; ---; 1.6; gr. 9; ---; ---.

Danley, James Odell. A Critique of the SMSG and UICSM Secondary School Mathematics Programs. (The University of Oklahoma, 1966.) Dis. Abst. 27A: 1197; Nov. 1966.

The two programs are critiqued and compared on the basis of mathematical content, sequence, and pedagogical innovations.

d; ---; ---; ---; ---; sec.; ---; ---.

Dixon, Lyle Junior. An Investigation of Ninth and Tenth Grade Texts and Commentaries of the School Mathematics Study Group for Indications of an Underlying Educational Philosophy. (University of Kansas, 1963.) Dis. Abst. 24: 5237; June 1964. (c-22, c-23, d-1)

It was concluded that the spiral organization and the "intuitive approach" in teaching which is used in SMSG algebra and geometry textbooks implies a pragmatic philosophy.

d; ---; ---; ---; ---; grs. 9, 10; ---; ---.

Howard, Francis Hawthorne. National Curriculum Reform Influence on Virginia Public High School Course Offerings. (University of Virginia, 1968.) Dis. Abst. 29A: 3913-3914; May 1969. (b-3)

Among 14 new programs was "SMSG and other new mathematics", offered by more schools (70 per cent) than any other new curriculum. (b-3)

d; ---; ---; ---; ---; grs. 9-12; ---; ---.

McIntosh, Jerry Allen. A Comparison of Student Achievement Relative to a Modern and Traditional Third Semester Course in High School Algebra. (Indiana University, 1964.) Dis. Abst. 25: 4563; Feb. 1965. (c-22)

No significant difference in achievement was found between groups having an SMSG or a traditional program. SMSG students achieved more when taught by an experienced teacher.

(I) modern or traditional course. (D) achievement.

e; 3.7; 2-s, 3-r; 4 classes; ---; gr. 11; 1 semester; non-norm.

Osborn, Kenneth Hugh. A Longitudinal Study of Achievement in and Attitude Toward Mathematics of Selected Students Using School Mathematics Study Group Materials. (University of California, Berkeley, 1965.) Dis. Abst. 26: 7119; June 1966. (a-6)

Study of SMSG materials for from one to three years did not result in a significant increase on arithmetic, algebra, or mathematical reasoning scores, but understanding of mathematics concepts increased. Attitude toward mathematics decreased.

f; ---; 1-only; 400 students; ---; gr. 10; ---; norm.

Williams, Emmet David. Comparative Study of SMSG and Traditional Mathematics. (University of Minnesota, 1962.) Dis. Abst. 23: 560; Aug. 1962. (a-4)

Little difference in achievement was found in grade 9 between classes using SMSG or traditional texts. Some differences favoring the SMSG-taught group were found in grade 10.

(I) use of SMSG or traditional materials. (D) achievement.

e; 3.16; 2-r, 3-s; 8 classes; 3.4, 3.5; grs. 9, 10; ---; norm.

Developmental projects (d-9)

Woodall, Parker Glenn. A Study of Pupils' Achievements and Attitudes in the School Mathematics Study Group and the Traditional Mathematics Programs of the Lewiston School District, 1960-1965. (University of Idaho, 1966.) Dis. Abst. 27B: 4040-4041; May 1967. (a-4, a-6)

A few significant differences were found in favor of traditionally-taught pupils, but in most cases there were no significant differences between traditional and SMSG groups.

(I) traditional or SMSG instruction. (D) achievement; attitude.

f; ---; ---; 3,624 students; 3.2, 3.5; grs. 4, 6, 8; 6 yrs.; norm.

Ziebarth, Raymond Allan. The Effect of Experimental Curricula on Mathematics Achievement in High School. (University of Minnesota, 1963.) Dis. Abst. 24: 4593; May 1964.

Students who had used SMSG materials over a two-year time period made significant gains in achievement as measured by traditional tests, and did as well as those using conventional materials on all except tests of fundamental operations.

(I) conventional or SMSG materials. (D) achievement.

f; ---; 2-s; ---; 3.2, 3.4, 3.5; grs. 7-10; ---; norm.

Developmental projects (d-9)

Other References

Ackerson, 1966	(d-8)
Alsaqqar, 1965	(a-7)
Baughman, 1968	(g-4)
Beninati, 1964	(b-3)
Bernabei, 1967	(f-1a)
Clark, 1966	(a-4)
Davis, 1970	(c-23)
Dessart, 1963	(d-5)
Dirr, 1967	(g-4)
Ebeid, 1964	(a-4)
Fey, 1969	(t-2d)
Foust, 1969	(b-3)
Friebel, 1965	(c-8)
Ginther, 1965	(d-1)
Glaser, 1970	(c-15)
Hancock, 1961	(b-3)
Hansen, 1963	(b-6)
Herriot, 1968	(e-2b)
Hight, 1962	(c-17)
Ikeda, 1965	(f-4)
Jamison, 1963	(d-3)
Johnson, A. F., 1968	(c-23)
Johnson, D. C., 1966	(a-4)
Kilpatrick, 1968	(a-5b)
Lawson, 1961	(c-22)
Maclay, 1969	(f-2c)
McKinney, 1965	(b-3)
Moser, 1966	(t-1d)
Neill, 1966	(f-4)
Nelson, C. W., 1962	(d-5)
Nelson, L. D., 1963	(d-1)
Palmer, 1968	(d-1)
Pang, 1968	(b-3)
Payne, 1965	(a-4)
Phelps, 1964	(a-6)
Recker, 1966	(t-2a)
Rising, 1966	(g-5)
Roberts, 1966	(d-1)
Romberg, 1968	(f-1a)
Rudnick, 1962	(b-3)
Schippert, 1965	(a-4)
Shuff, 1962	(a-4)
Smith, 1964	(t-1b)
Snyder, 1967	(e-4)
Strowbridge, 1967	(f-2b)
Thomas, 1970	(c-17)
Tremel, 1964	(c-9)
Whitaker, 1962	(t-2b)
Wolfe, 1963	(a-4)

Diagnosis (e-1)

Stein, Harry L. Characteristic Differences in Mathematical Traits of Good, Average, and Poor Achievers in Demonstrative Geometry. (University of Minnesota, 1942.)

Other References

Ayre, 1939	(c-23)
Cronbach, 1940	(c-23)
Kellar, 1940	(c-22)

Buckingham, Guy E. Nature, Frequency and Persistence of Errors Made by Students of First Year Algebra in the Four Fundamental Processes of Addition, Subtraction, Multiplication, and Division. (Northwestern University, 1930.) (c-3, c-20, c-22)

Hantjis, Anthony William. A Study of Business Arithmetic Errors in Relationship to Selected Student Factors. (Temple University, 1969.) Dis. Abst. 31A: 1158-1159; Sept. 1970.

About 70 per cent of all errors were computational. Students who had taken business courses were less accurate.

f; ---; 2-s; 446 students; ---; grs. 10-12; ---; ---.

Peak, Philip. Efficiency in First Year Algebra. (Indiana University, 1955.) Dis. Abst. 15: 1574-1575; Sept. 1955. (c-22, f-1b)

It was concluded that students have not been taught to use arithmetic knowledge in algebra. Specific strengths and weaknesses were cited.

s; ---; 2-s; 3,327 students (129 classes); 1.6; gr. 9; ---; non-norm.

Silas, Paul Gordon. Difficulty in First Year Algebra: A Contribution to the Understanding of Error. (University of Iowa, 1932.) (c-22)

Other References

Brown, 1957	(f-1b)
Durrance, 1965	(d-4)
Montgomery, 1959	(c-6)

Diagnostic procedures (e-1b)

Bobier, Darold Thomas. The Effectiveness of the Independent Use of Programmed Textbooks in Aiding Students to Overcome Skill Weaknesses in English Mechanics and Arithmetic. (University of Denver, 1964.) Dis. Abst. 25: 3424-3425; Dec. 1964. (d-5)

No significant differences were found between groups who used programmed textbooks on a self-study program at home or at school, and groups who had conventional instruction with or without remedial instruction.

(I) use of programmed textbooks or regular instruction, with or without remedial instruction. (D) achievement gain-difference scores.

e; 2.4; 2-r, 3-r; ---; 3.3, 3.5; gr. 12; 9 wks.; ---.

Griffith, Harold T. The Effect of a Diagnostic and Remedial Drill System in Arithmetic Computation of the Junior High Level on Computational Ability, Accuracy, and Self-Reliance in Arithmetic Situations. (Pennsylvania State University, 1949.) (a-5a, e-2)

Scott, Allen Wayne. An Evaluation of Prescriptive Teaching of Seventh-Grade Arithmetic. (North Texas State University, 1969.) Dis. Abst. 30A: 4696; May 1970. (d-5, e-4)

Underachievers using programmed materials appropriate to meet diagnosed needs made a significantly greater gain in computation scores than did students in the regular classroom. Differences on concepts and applications were not significant.

(I) use of programmed materials. (D) achievement.

e; 2.4; 2-m, 3-r; 50 students; 3.8; gr. 7; 7 wks.; norm.

Thompson, Ronald B. The Administration of a Program of Diagnosis and Remedial Instruction in Arithmetic, Reading, and Language Usage in the Secondary School. (University of Nebraska, 1940.) (e-2)

Other References

Bernstein, 1955	(e-2)	West, 1970	(f-1a)

Bernstein, Allen L. A Study of Remedial Arithmetic Conducted with Ninth Grade Students. (Wayne University, 1955.) Dis. Abst. 15: 1567-1568; Sept. 1955. (e-1b, e-4)

Eighty per cent of the error patterns diagnosed were in three categories: use of zero in multiplication and division, borrowing in subtraction, and understanding of the decimal point in all four processes. Scores significantly increased 13.9 points after remedial instruction in large classes and 23.3 points after individualized instruction.

(I) group or individualized instruction. (D) achievement.

a; ---; 1-only; ---; 1.2, 1.5, 1.6, 6.4; gr. 9; ---; norm, non-norm.

Child, Clyde Compton. A Study of the Effects of Summer School Programs on Student Achievement. (Brigham Young University, 1967.) Dis. Abst. 28A: 2475; Jan. 1968. (f-2)

Students enrolled in summer programs made greater gains in initial achievement than those not enrolled. Effects of enrollment in one subject and achievement in another should be studied.

(I) enrollment in summer school. (D) achievement.

f; ---; 1-only; 1,357 students; 3.4, 6.2; grs. 5, 7, 10; ---; norm.

Melaragno, Ralph James. A Comparison of Two Methods of Adapting Self-Instructional Materials to Individual Differences Among Learners. (University of Southern California, 1966.) Dis. Abst. 27B: 3273-3274; Mar. 1967. (c-2, c-23, d-6a)

No significant differences in achievement were found between students using linear, branching, or prediction programs, but the linear program took significantly more time.

(I) branching, prediction, or linear programs. (D) achievement; time.

e; 2.12; 2-s, 3-r; 44 students; 3.2; sec.; ---; non-norm.

Remediation (e-2)

Other References

Anderson, 1970	(e-2d)
Beougher, 1969	(c-26)
Griffith, 1949	(e-1b)
Shaw, 1968	(a-5a)
Thompson, 1940	(e-1b)

Beaton, Mary Anne. A Study of Underachievers in Mathematics at the Tenth Grade Level in Three Calgary High Schools. (Northwestern University, 1966.) Dis. Abst. 27A: 3215-3216; Apr. 1967. (a-6, f-3)

Underachievers had lower interest and attitude scores than achievers of comparable ability. A significantly greater number of parents of underachievers indicated they had liked mathematics least of all school subjects, while parents of achievers considered mathematics to twelfth-grade level important to students today.

f; ---; 2-s, 3-m; 13 students; ---; gr. 10; ---; norm, non-norm.

Fenner, Elmer David, Jr. An Investigation of the Concept of Underachievement. (Western Reserve University, 1965.) Dis. Abst. 27A: 600; Sept. 1966. (f-2c)

Consistent identification as an underachiever was almost nonexistent with the measures used. Those selected with an arithmetic test were not likely to be underachieving in other subjects, nor was it a good predictor of later achievement.

r; ---; 2-s; 84 students; 6.4; grs. 11, 12; ---; norm.

Mallory, Virgil Sampson. The Relative Difficulty of Certain Topics in Mathematics for Slow-Moving Ninth Grade Pupils. (Teachers College, Columbia University, 1938.) (b-3, e-2b)

Ross, Ramon Royal. A Case Study Description of Underachievers in Arithmetic. (University of Oregon, 1962.) Dis. Abst. 22: 2294; Jan. 1962.

Underachievement appeared to be related to multiple factors. Students were characteristically defeated and withdrawn in their attitude toward school.

c; ---; 2-s; 20 students; ---; grs. 6, 7; ---; norm.

Low achiever, underachiever (e-2a)

Sherer, Margaret Turner. An Investigation of Remedial Procedures in Teaching Elementary School Mathematics to Low Achievers. (The University of Tennessee, 1967.) Dis. Abst. 28A: 4031-4032; Apr. 1968. (d-3)

Pupils taught by author-developed materials, using instructional aids such as drawings, counters, and number lines and charts, showed significantly greater gain in arithmetic achievement than those taught by traditional procedure. Tutors manifested a more favorable attitude toward arithmetic by the special method.

(I) type of tutor-material. (D) achievement.

e; 3.3; 2-s, 3-r; 47 students; 2.6, 4.3, 4.4, 4.7; grs. 3-7; ---;

non-norm.

Snellgrove, John Louis. A Study of Relationships Between Certain Personal and Socio-Economic Factors and Underachievement. (University of Alabama, 1960.) Dis. Abst. 21: 1859; Jan. 1961. (e-5, e-7)

Among other findings, there was a positive relationship between grades of underachievers and motivation in mathematics. Personality maladjustment decreased between grades 7 and 12.

r; ---; 2-s; 196 students; 1.3, 1.6, 6.4; grs. 7-12; ---; norm,

non-norm.

Other References

Brown, 1957	(a-5d)	Tanner, 1966	(d-5)
Burgess, 1970	(d-3)	Wiebe, 1966	(d-5)
Cech, 1970	(d-3)		
Dreyfuss, 1969	(e-7)		
Engel, 1967	(d-3)		
Fischer, 1968	(e-5)		
Kleckner, 1969	(a-4)		

Gibney, Thomas Charles. Comparison of Two Methods of Instruction for Reviewing Multiplication in Slow Learner Sections of Seventh Grade. (State University of Iowa, 1961.) Dis. Abst. 22: 3084; Mar. 1962. (c-3c)

Slow learners who received eight multiplication review lessons did not achieve significantly more than those using the textbook on the immediate posttest, but did have a greater gain between pretest and retention test.

(I) use of review lessons or usual textbook. (D) achievement; retention.

e; 2.3 r; 2-s, 3-r; 14 classes; 3.4; gr. 7; 11 days; non-norm.

Herriot, Sarah Florence Tribble. The Secondary School "Slow-Learner" in Mathematics. (Stanford University, 1967.) Dis. Abst. 28A: 3072-3073; Feb. 1968. (d-9)

When pupils classified as slow learners studied material for two years, they achieved a greater gain than a higher ability control group achieved in one year. Thus the pace of instruction affects achievement scores of slow learners.

(I) one or two years for algebra. (D) achievement.

e; 3.21; 2-s, 3-s, r; ---; 3.2, 3.5, 6.2, 6.4; grs. 7, 9; 2 yrs.;

norm.

Krulik, S. The Use of Concepts in Mathematics New in Teaching the Slow Learner. (Teachers College, Columbia University, 1961.)

Sederberg, Charles Harbert. A Comparison of Mathematics Teaching Methods for Average and Below-Average Ninth Grade Pupils. (University of Minnesota, 1964.) Dis. Abst. 25: 2384-2385; Oct. 1964. (a-4, c-21, c-22)

The general mathematics course resulted in higher computation scores. Lower ability students did not acquire algebraic skills from the modified algebra instruction.

(I) general mathematics, modified algebra, or no formal mathematics instruction groups. (D) achievement; attitude.

e; 3.4; 2-s, 3-r; 264 students; 3.2; gr. 9; ---; norm.

Slow learner (e-2b)

Other References

Glismann, 1968	(d-8)
Harrison, 1969	(e-2d)
Haynes, 1970	(t-2c)
Mallory, 1938	(e-2a)
Mastbaum, 1969	(d-4)
Young, 1969	(a-3)

Deshpande, Anant Sakharam. Development of a Battery for the Lower Continuum of Basic Achievement of Common Knowledge and Skills. (University of Georgia, 1968.) Dis. Abst. 29A: 2999; Mar. 1969. (f-1a)

An instrument to measure skills required for daily living was developed for use with mentally retarded or educationally backward adolescents. Nine of 11 subtests were found to have reliabilities of .93 to .99.

s; ---; 1-only; 106 students; ---; MR; ---; non-norm.

Jenkins, Offa Lou Harris. A Study of the Effect of Three Methods of Teaching Arithmetic to Mentally Handicapped Pupils. (University of Virginia, 1967.) Dis. Abst. 28A: 3074; Feb. 1968. (c-8, d-5)

Programmed arithmetic materials appeared to be more effective than a social approach or conventional textbook procedures for teaching arithmetic concepts.

(I) use of programs, textbooks, or social approach.
(D) achievement.

e; 3.12; 2-s, 3-s; 90 students (6 classes); ---; ages 13-17 (MR);

45 hrs.; norm, non-norm.

Johnson, Gordon Floyd. An Investigation of Programed Procedures in Teaching Addition and Subtraction to Educable Mentally Retarded Subjects. (University of Oregon, 1966.) Dis. Abst. 27A: 4132; June 1967. (c-3a, c-3b, d-5)

Programmed materials, whether experimenter-made or commercial, when used in conjunction with conventional teaching plans, are more effective than conventional instruction alone.

(I) type of programmed material. (D) achievement.

e; 3.11; 2-s, 3-r; 72 students; 3.2, 3.3; ages 9-14 (MR); 10 wks.;

norm.

Mentally retarded (e-2c)

Stewart, Norman Alton. An Exploratory Study of the Relationship of Length of Time Spent in Special Classes and Selected Aspects of Personality, Behavior, and Academic Achievement of Slow Learning Children. (Case Western Reserve University, 1968.) Dis. Abst. 30A: 3803-3804; Mar. 1970.

Of 27 traits, only two (not including arithmetic achievement) were found to be related to length of time spent in special classes. There was some indication that early placement may adversely affect girls' arithmetic achievement.

r; ---; ---; 142 students; 4.4, 5.2; CA 16, IQ 67 (EMR); ---; ---.

Other References

Connolly, 1968	(f-1a)
Miller, 1970	(g-7a)

Anderson, Richard Mark. A Study of Cadet Teaching as a Method to Improve the Multiplication and Division Proficiency of a Selected Sample of Junior High School Students. (The University of Iowa, 1970.) Dis. Abst. 31A: 2782; Dec. 1970. (c-3c, c-3d, e-2)

Junior high students who received special instruction in multiplication and division skills achieved significant gains in proficiency in those skills whether or not they tutored fifth graders in those skills. Tutored fifth graders achieved as well as those untutored.

(I) tutoring aid or regular instruction only. (D) achievement.

e; 3.4; 2-r, 3-s; ---; 3.2; gr. 5, jr. high; 3 mos.; non-norm.

Burrow, Daniel Alfred. Summer Tutoring: An Investigation of Older Volunteer Students Tutoring Younger Students in Arithmetic Computation. (University of Maryland, 1970.) Dis. Abst. 31A: 2244; Nov. 1970. (c-3)

Low-achieving pupils from grades 3, 4, and 5 who were tutored by high-achieving pupils from grades 6, 7, and 8 achieved higher gain scores on computational skills than did untutored pupils.

(I) tutoring or non-tutoring. (D) achievement.

e; 2.4; 2-s, 3-r; 72 students; ---; grs. 3-8; 6 wks.; norm.

Coker, Homer. An Investigation of the Effects of a Cross-Age Tutorial Program on Achievement and Attitudes of Seventh Grade and Eleventh Grade Students. (University of South Carolina, 1968.) Dis. Abst. 29A: 3319-3320; Apr. 1969. (e-4)

Boys improved significantly more in mathematics than girls, but the mode of treatment was not significant.

(I) use of tutorial program; sex. (D) achievement; attitude.

a, ---; 1-only; 284 students; 3.2; grs. 7, 11; ---; ---.

Tutoring (e-2d)

Harrison, Morris Glenn. A Study to Determine the Effectiveness of Student Tutors in Promoting Achievement Gain with Slow-Learning Students in Related Math I. (Texas Technological College, 1968.) Dis. Abst. 29A: 3324-3325; Apr. 1969. (e-2b)

The gain for the tutored group for the first ten hours of instruction was significantly higher than that of the non-tutored group, but the latter exceeded the tutored group slightly in total gain over the entire fifty-hour experiment.

(I) tutoring or non-tutoring. (D) achievement.

e; 3.4; 2-s, 3-m; 2 classes; ---; sec.; 50 hrs. (10 wks.); non-norm.

Baker, Russell Ray. Program Provisions in Michigan Junior High School for Superior Students in Mathematics. (University of Michigan, 1961.) Dis. Abst. 22: 470-471; Aug. 1961. (c-22, e-3b)

There were special mathematics programs (enrichment and/or acceleration) for superior students in 17.6 per cent of the schools. Eighth graders accelerated a full year (in algebra) had more favorable perceptions than those accelerated only a half-year.

s; ---; 2-s; ---; 1.6, 1.10; grs. 7, 8; ---; ---.

Ferguson, Milton Lewis. The Peabody-Public School Summer High School Program for Academically Talented Students in Mathematics and Science. (George Peabody College for Teachers, 1960.) Dis. Abst. 21: 560; Sept. 1960.

Participation in the enrichment program contributed to an increase in mathematics achievement.

(I) enrichment program. (D) achievement.

e; 3.4; 1-only; ---; ---; gr. 11; ---; ---.

Gardner, Randolph Scott. Instruments for the Enrichment of Secondary School Mathematics. (Columbia University, 1947.)

Jones, Major Boyd. Techniques, Methods, Procedures and Provisions Used in Selected Maryland Public Secondary Schools in Teaching Mathematics to Rapid Learners. (Cornell University, 1959.) Dis. Abst. 20: 3663-3664; Mar. 1960.

Over 90 per cent of the schools sampled reported some type of ability grouping. Almost 60 per cent provided special courses, while 45% formed coaching groups.

s; ---; 2-s; ---; 1.6; grs. 9-12; ---; ---.

Lang, Robert Wilmer. A Study of an Accelerated Mathematics Program. (Wayne State University, 1962.) Dis. Abst. 23: 1248; Oct. 1962.

Reactions to the program were favorable, and achievement was comparable to that of students in the regular program.

s; ---; 1-only; 276 students and parents, 11 teachers; ---; grs. 7-9; ---; ---.

Long, Roy Gilbert. A Comparative Study of the Effects of an Enriched Program for the Talented in Advanced Algebra Classes. (Indiana University, 1957.) Dis. Abst. 18: 529-530; Feb. 1958. (c-22)

When talented students received an enrichment program, achievement of both talented and non-talented students was significantly higher than for students in a regular program. No significant differences were found on another test of competence.

(I) enrichment or regular program; talented or non-talented levels. (D) achievement; functional competence; attitudes.

e; 2.3; 2-r, 3-r; 98 students (4 classes); 3.3, 3.4; gr. 11; 1 school yr.; norm, non-norm.

Payne, Joseph Neal. Enrichment Topics for First and Second Course Algebra for Bright Pupils. (University of Virginia, 1955.) Dis. Abst. 15: 2491-2492; Dec. 1955. (c-22)

Enrichment materials on 27 topics for individual use were developed and tested. There appeared to be a close positive relationship between mathematical ability and success with the materials.

(I) use of enrichment materials. (D) achievement; attitude.

a; ---; 2-s; 84 students; 1.6; grs. 9-11; ---; non-norm.

Ray, John James. A Longitudinal Study of the Effects of Enriched and Accelerated Programs on Attitude Toward and Achievement in Eighth Grade Mathematics and Ninth Grade Algebra. (Indiana University, 1961.) Dis. Abst. 22: 1099; Oct. 1961. (a-6, c-22, e-3b)

Specific conclusions are cited indicating that both enrichment and acceleration are beneficial.

(I) enriched or accelerated programs. (D) achievement; attitude.

a; ---; 1-only; 8 classes; ---; grs. 8, 9; 1 yr.; non-norm.

Ware, James Gareth. An Enrichment Program for Superior Students in High School Plane Geometry. (George Peabody College for Teachers, 1962.) Dis. Abst. 23: 3917-3918; Apr. 1963. (c-23, e-4)

Use of six units of enrichment material resulted in significantly higher achievement for superior students grouped homogeneously and somewhat higher achievement for those grouped heterogeneously than was attained by groups not using the material.

(I) enrichment with homogeneous or heterogeneous grouping.
(D) achievement.

e; 2.3; 2-s, 3-r; 9 classes; 3.5; gr. 10; 15 wks.; norm.

Other References

Berger, 1962	(d-4)
Fischer, 1968	(e-5)
Johnson, 1967	(e-7)
Koehn, 1960	(f-2c)
Kozak, 1952	(b-3)

Overachiever (e-3a)

[No dissertations were assigned with a primary reference to this category.]

Other References

Brown, 1957	(a-5d)
Pearl, 1967	(e-4)

Burdick, Charles Philip. (A Study of the Effects of Academic Acceleration on Learning and on Retention of Learning Addition in the Set of Integers. (Syracuse University, 1969.) Dis. Abst. 31A: 54-55; July 1970. (b-5, c-9)

It appeared that grade 6 is the optimal level for teaching addition with integers, since there was the greatest increase in learning from instruction, attainment of group criterion performance, and non-significant loss on the retention test. However, grade 5 had the greatest increase from pre- to retention test.

(I) instruction at varying grade levels. (D) achievement.

e; 3.21 r; 1-only; 245 students; 1.6; grs. 5-8; 3 days (retention,

6 wks.); non-norm.

Fredstrom, Paul Norman. An Evaluation of the Accelerated Mathematics Program in the Lincoln, Nebraska Public Schools. (The University of Nebraska Teachers College, 1964.) Dis. Abst. 25: 5628-5629; Apr. 1965.

Students who had been accelerated achieved nearly as well as their older course-peers on tests, but had lower mathematics grade averages and lower attitudes.

f; ---; 2-s; 1,288 students; ---; gr. 12; ---; norm.

Friesen, Edwin J. A Comparative Study of the Achievement of Eighth- and Ninth-Grade Algebra Pupils in the Wichita Intermediate Schools. (University of Kansas, 1960.) Dis. Abst. 21: 2628-2629; Mar. 1961. (c-22)

Mathematically talented eighth graders achieved as well or better in algebra than ninth grade students in the same schools.

f; ---; 2-s; 985 students; 3.2, 3.5; grs. 8, 9; ---; ---.

Acceleration (e-3b)

Ludeman, Clinton John. A Comparison of Achievement in an Accelerated Program and a Standard Program of High School Mathematics in Lincoln, Nebraska, Schools. (The University of Nebraska, 1969.) *Dis. Abst.* 31A: 299-300; July 1970. (f-2c, p-2)

Those in the accelerated program generally achieved significantly higher than those in the standard program, with either IQ or content level accounting for score differences. Grades in calculus were also higher for those in the accelerated program.

(I) accelerated or standard program; IQ; levels of content.
(D) achievement.

f; ---; 2-s, 3-r; ---; 3.2, 3.4; gr. 12; ---; norm.

Stokes, William Glenn. Enrichment for Superior Ninth Grade Algebra Students. (George Peabody College for Teachers, 1957.) *Dis. Abst.* 19: 538; Sept. 1958. (c-22)

Superior students who used enrichment materials gained more on a test of general mathematics competence and scored higher on an algebra test than superior students who did not use the materials.

(I) use of enrichment materials. (D) achievement.

e; 3.3; 2-s, 3-r; 373 students (17 classes); 3.5; gr. 9; 1 school yr.; norm.

Other References

Alam, 1969	(e-4)
Baker, 1961	(e-3)
Dezelle, 1966	(e-5)
Mikkelson, 1963	(e-4)
Ray, 1961	(e-3)

Alam, Sami Jamil. A Comparative Study of Gifted Students Enrolled in Separate and Regular Curriculums. (Wayne State University, 1968.) Dis. Abst. 29A: 3354; Apr. 1969. (e-3b)

Gifted students in the special program did significantly better than those in the regular program in arithmetic applications and five other non-mathematical aspects.

(I) program for academically gifted or regular program; background; parental and peer relationships; participation in activities.
(D) achievement; academic responsibility; critical thinking; leadership; emotional stability; adjustment to reality; self-esteem.

f; ---; 2-s; 32 students; 1.1, 3.4; gr. 9; ---; norm, non-norm.

Bailey, Herman Perry. A Study of the Effectiveness of Ability Grouping on Success in First Year Algebra. (St. Louis University, 1967.) Dis. Abst. 28A: 3061-3062; Feb. 1968. (c-22, f-2c)

No significant differences in achievement on a standardized test were found between students in homogeneous or heterogeneous classes, but students in the heterogeneous classes achieved significantly higher grades.

(I) homogeneous or heterogeneous grouping; IQ; previous achievement.
(D) algebra achievement; grades.

f; ---; 1-only; 16 classes; 3.5; gr. 9; ---; ---.

Bierden, James Edward. Provisions for Individual Differences in Seventh Grade Mathematics Based on Grouping and Behavioral Objectives: An Exploratory Study. (The University of Michigan, 1968.) Dis. Abst. 30A: 196-197; July 1969. (a-5i)

A combination of whole-class instruction and flexible intra-class grouping based on achievement of objectives resulted in significant gains in computational skills, concept knowledge, and attitude.

a; ---; 1-only; 2 classes; ---; gr. 7; 1 yr.; norm, non-norm.

Grouping procedures (e-4)

Cawelti, Gordon Lou. The Status of Administrative and Instructional Provisions in Ability Grouped Classes of Mathematics and English in Selected Midwestern High Schools. (State University of Iowa, 1962.) Dis. Abst. 23: 2749; Feb. 1963. (t-2d)

Rapid learner classes in mathematics were found to be larger than slow learner classes. Teachers of the rapid learner classes had more mathematics preparation.

s; ---; ---; 42 schools; ---; grs. 9, 10; ---; ---.

Hunter, Lottchen Lipp. Group Process in Secondary School Mathematics. (Columbia University, 1951.) (a-4)

Mahler, Fred Leon. A Study of Achievement Differences in Selected Junior High School Gifted Students Heterogeneously or Homogeneously Grouped. (The University of Houston, 1961.) Dis. Abst. 22: 267; Jan. 1962.

No significant differences in arithmetic achievement were found between students grouped homogeneously or heterogeneously.

(I) homogeneous or heterogeneous grouping. (D) achievement.

e; 3.4; 2-s, 3-s; ---; 1.2; grs. 7, 8; 12 mos.; ---.

Mikkelson, James Elliot. An Experimental Study of Selective Grouping and Acceleration in Junior High School Mathematics. (University of Minnesota, 1962.) Dis. Abst. 23: 4226-4227; May 1963. (e-3b)

No differences resulted from homogeneously grouping seventh graders of superior mathematical ability when no adjustments were made in the program. Acceleration was an effective time-saver when used with homogeneously grouped eighth graders of high ability.

(I) homogeneous or heterogeneous grouping; without program adaptation or with acceleration. (D) achievement.

e; 3.3; 2-s, 3-r; 4 classes (280 students); 3.2, 3.4, 3.5; grs. 7, 8; ---; norm, non-norm.

Mortlock, Roland Sidney. Provision for Individual Differences in Eleventh Grade Mathematics Using Flexible Grouping Based on Achievement of Behavioral Objectives: An Exploratory Study. (The University of Michigan, 1969.) Dis. Abst. 30A: 3643; Mar. 1970. (a-5i)

No significant differences in achievement were found between classes using flexible grouping using behavioral objectives and earlier classes who had used a textbook and no grouping. The need for flexible grouping was indicated, however, and both achievement and attitude changes were positive.

(I) grouping using objectives at three levels of difficulty or no grouping. (D) achievement; attitude; anxiety.

e; 3.21; 1-only; 2 classes (36 students); 1.6, 1.7, 3.4; gr. 11;

1 yr.; ---.

Nix, George Carol. An Experimental Study of Individualized Instruction in General Mathematics. (Auburn University, 1969.) Dis. Abst. 30A: 3367-3368; Feb. 1970. (c-21)

Students with low IQ, those with average mathematics ability, and boys achieved significantly more under individualized instruction than under group-oriented instruction.

(I) group-oriented or individualized instruction; age; sex; previous achievement. (D) achievement; teacher time; attitude.

e; 3.4; 2-s, 3-s; 6 classes; 3.4; gr. 8; ---; norm.

Pearl, Andrew Wilder. A Study of the Effects on Students' Achievement and Attitudes When They Work in Academic Teams of Three Members. (Cornell University, 1967.) Dis. Abst. 28A: 59-60; July 1967. (e-3a)

Students who worked in three-member teams achieved better than those who worked individually. No change in negative attitude toward mathematics was found.

(I) work in three-member teams or individually. (D) achievement; transfer.

e; 2.2; 2-r, 3-m; 88 students; ---; grs. 7, 8; 1 yr.; norm.

Grouping procedures (e-4)

Sinks, Thomas Alonzo. How Individualized Instruction in Junior High School Science, Mathematics, Language Arts, and Social Studies Affects Student Achievement. (University of Illinois, 1968.) Dis. Abst. 30A: 224-225; July 1969.

The individualized program appeared to result in increased gains in achievement scores and desirable changes in behavior, attitude, and learning strategies.

(I) individualized or traditional instruction. (D) achievement.

e; 3.4; 2-s, 3-m; 4 classes (108 students); 3.2; gr. 7; 1 yr.; norm.

Snyder, Henry Duane, Jr. A Comparative Study of Two Self-Selection-Pacing Approaches to Individualizing Instruction in Junior High School Mathematics. (University of Michigan, 1966.) Dis. Abst. 28A: 159-160; July 1967. (a-4, d-9)

No significant differences were found in achievement or characteristics of pupils who selected either independent work approach, though gains were greater than for control classes.

(I) two individualized approaches. (D) achievement; attitude.

e; 3.4; 1-only; ---; ---; grs. 7, 8; 1 yr.; ---.

Sommers, Mildred Emily. A Comparative Study of Two Grouping Procedures in the Junior High School on Measures of Ability and Achievement in Mathematics and English. (Michigan State University, 1960.) Dis. Abst. 21: 1115-1116; Oct. 1960.

Homogeneous grouping appeared to have a positive effect on achievement.

(I) ability grouping. (D) achievement.

a; ---; 1-only; 291 students; 3.4, 6.4; grs. 7, 8; 2 yrs.; norm.

Willcutt, Robert Ernest. Ability Grouping by Content Subject Areas in Junior High School Mathematics. (Indiana University, 1967.) Dis. Abst. 28A: 2152; Dec. 1967.

No significant differences were found in achievement between self-contained heterogeneous classes and homogeneous classes taught by a team, though changes in attitude resulted.

Grouping procedures (e-4)

(I) heterogeneous or homogeneous grouping. (D) achievement; attitude.

a; ---; ---; ---; ---; gr. 7; ---; ---.

Other References

Bachman, 1969	(a-3)
Bernstein, 1955	(e-2)
Campbell, 1965	(a-3)
Chiotti, 1961	(a-3)
Coker, 1969	(e-2d)
Kriewall, 1970	(b-3)
Sanders, 1966	(a-3)
Scott, 1970	(e-1b)
Shull, 1967	(f-2c)
Ware, 1963	(e-3)
Wright, 1965	(a-4)

Physical, psychological, and/or social characteristics (e-5)

Berenberg, Albert N. A Study of the Relationship Between Skills in Certain Cognitive Areas and Certain Patterns Involving Attitudes, Interests and Identifications in Eighth Grade Students. (New York University, 1957.) Dis. Abst. 18: 651-652; Feb. 1958. (a-6)

Arithmetic skills were not found to be related more to the psychosexual identification than to the actual sex of the student.

r; ---; ---; ---; 3.15; gr. 8; ---; norm, non-norm.

Callister, Sheldon Lathel. Stress, Anxiety, and Achievement Relationships in Programmed and Conventional Algebra and Geometry Classes. (Brigham Young University, 1965.) Dis. Abst. 26: 5860; Apr. 1966. (c-22, c-23, d-5, g-4)

Students in conventional classes were under greater stress than those in programmed classes, but level of anxiety had no effect on comparative achievement level.

(I) anxiety level; conventional or programmed text classes.
(D) achievement; stress level.

e; 3.4; 2-s, 3-m; 132 students; ---; grs. 8, 9; ---; norm, non-norm.

Dezelle, Walter, Jr. A Comparative Study of the Changes in Personality in Academically Able Seventh-Grade Children Assigned or Not Assigned to an Accelerated Class in Mathematics Upon Entering Junior High School. (University of Houston, 1965.) Dis. Abst. 26: 4438-4439; Feb. 1966. (e-3b)

Observations suggested that earlier maturational changes in personality were associated with assignment to one of the accelerated classes in mathematics.

(I) acceleration. (D) personality score change.

e; 3.1; 2-s, 3-m; 140 students; 3.10, 3.13; gr. 7; 1 yr.; non-norm.

Fischer, Erby Curtis. A Study of the Relationship Between Selected Personality Factors and Special Disabilities in Mathematics. (University of Alabama, 1967.) Dis. Abst. 28A: 2891-2892; Feb. 1968. (e-2a, e-3)

Students with special disabilities exhibited more conflicts and maladjustments in family relationships and are more rebellious than achieving students, though boys appeared more emotionally stable and better adapted. Achievers were better adjusted than underachievers.

r; ---; 2-s, 3-s; ---; 6.2, 6.4; gr. 9; ---; norm.

Hanna, Gerald Stanley. An Investigation of Selected Ability, Aptitude, Interest, and Personality Characteristics Relevant to Success in High School Geometry. (University of Southern California, 1965.) Dis. Abst. 26: 3152-3153; Dec. 1965. (c-23)

Students' own predictions, algebra and arithmetic grades, and certain tests were found to be effective predictors of geometry success. An interest inventory contributed little to prediction scores.

r; ---; 1-only; 202 students; 3.13, 6.1, 6.4; gr. 10; 18 wks.;

norm, non-norm.

Harte, Sister Mary Laboure. Anxiety and Defensiveness as Related to Measurable Intelligence and Scholastic Achievement of Selected Institutionalized Children. (Fordham University, 1966.) Dis. Abst. 27A: 2884; Mar. 1967. (f-2b)

In arithmetic achievement, high defensive boys performed significantly higher than high anxious and low defensive boys, with no significant differences between groups of girls.

(I) anxiety and defensiveness levels. (D) achievement.

f; ---; 1-only; 184 students; 3.2; grs. 2-8; ---; norm.

Physical, psychological, and/or social characteristics (e-5)

Hicks, John Simpson. Introversion and Extraversion and Their Relationship to Academic Achievement Among Emotionally Disturbed Children. (Columbia University, 1968.) Dis. Abst. 29A: 3462; Apr. 1969.

No significant relationships were found between better achievement and introversion, for emotionally disturbed children aged 9 to 16. Low-achieving introverts tended to have low ability, super-ego strength, and assertiveness; low-achieving extraverts seemed to be very sensitive, anxious, and lacking individuality. Reading achievement was not significantly higher than arithmetic achievement.

r; ---; 1-only; 60 students; ---; ages 9-16; ---; norm, non-norm.

Lavos, George. Patterns of Intelligence and Achievement Among Deaf Children. (The University of Michigan, 1965.) Dis. Abst. 27A: 397; Aug. 1966. (f-2b)

Relationships between IQ and achievement variables were determined, with that of arithmetic included but not clearly specified.

r; ---; ---; 67 students; 1.6, 3.13, 6.3; ages 12, 15; ---; ---.

MacPherson, Eric Duncan. Some Correlations of Anxiety in Learning Programmed Mathematics. (Washington State University, 1966.) Dis. Abst. 27A: 2948; Mar. 1967. (c-12, d-5, g-4)

Significant relationships existed between: (1) anxiety and time to complete programmed lessons on the language of sets; and (2) IQ and learning at the first four levels of Bloom's Taxonomy.

(I) IQ; anxiety. (D) language of sets test performance.

r; ---; 1-only; 84 students; 6.4; gr. 11; ---; non-norm.

Miller, W ne Edgar. A Study of Amish Academic Achievement. (The University of Michigan, 1969.) Dis. Abst. 30A: 4197; Apr. 1970.

Amish pupils scored significantly higher than non-Amish pupils on arithmetic problem solving. Integration did not appear to have a positive effect.

f; ---; 2-s; 5 groups; 3.2; gr. 8; ---; norm.

Morgan, James Hurley. The Relationship Between Levels of Anxiety and Mathematics Achievement in Programed and Teacher-Directed Instruction. (The University of Connecticut, 1965.) Dis. Abst. 26: 3760; Jan. 1966. (c-23, c-30, d-5)

No significant differences in achievement were found between groups receiving programmed instruction and groups taught by teachers. Anxiety level of students was not significantly related to achievement or teaching method.

(I) programmed or regular instruction; level of anxiety.
(D) achievement.

e; 3.4 r; 1-only; 6 classes; 3.5, 6.4; gr. 10; ---; norm, non-norm.

Pollard, James Ray. The Significance of Quantitative and Linguistic Abilities for Academic Performance and High School Adjustment. (University of Missouri, 1956.) Dis. Abst. 16: 2089-2090; Nov. 1956. (f-2c)

Analysis of discrepancy scores indicated that girls whose Linguistic scores are higher than their Quantitative scores will have significantly better achievement and adjustment in high school than those whose Quantitative scores are higher than Linguistic scores.

s; ---; 1-only; ---; ---; grs. 9-12; ---; norm.

Rosenfeld, Irwin Joseph. Mathematical Ability as a Function of Perceptual Field-Dependency and Certain Personality Variables. (The University of Oklahoma, 1958.) Dis. Abst. 19: 880-881; Oct. 1958. (g-4)

Poorer mathematics students were more field-dependent and better students were more analytic and independent in their perception. Other personality factors of better achievers included greater awareness.

r; ---; 1-only; 100 students; 6.4; gr. 9; ---; norm, non-norm.

Physical, psychological, and/or social characteristics (e-5)

Swafford, Jane Oliver. A Study of the Relationship Between Personality and Achievement in Mathematics. (University of Georgia, 1969.) Dis. Abst. 30A: 5353; June 1970.

Students were classified into four groups on the basis of achievement in skills and understandings. Six personality factors were identified as discriminant in separating consistent achievement groups, and differences on various factors were noted.

f; ---; 1-only; 335 students; 3.2, 3.20; gr. 8; ---; non-norm.

Zamboni, Floyd Frank. A Study of the Effect of Two Different Classroom Procedures Upon Student Achievement, Anxiety and Attitudes of Second Year High School Algebra II/Trigonometry Students. (Colorado State College, 1968.) Dis. Abst. 29B: 3004-3005; Feb. 1969. (a-6, c-22, c-24)

No significant differences in achievement or test anxiety were found between classes having "relaxed" or "high stress" procedures.

(I) regular or "high-stress" (graded homework, unannounced quizzes, no peer help) procedures. (D) achievement; anxiety; attitudes.

e; 3.4; 2-s, 3-s; 3 classes (78 students); 3.2; gr. 11; 1 yr.;

non-norm.

Other References

Costantino, 1969	(a-3)
Ferderbar, 1965	(a-6)
Gallagher, 1968	(t-2d)
Johnson, 1967	(e-7)
Snellgrove, 1961	(e-2a)

Cragg, John Clive. A Statistical Analysis of Some Aspects of the Pupil Placement Program in Three High Schools of a Metropolitan School System. (University of Georgia, 1966.) Dis. Abst. 27A: 2308; Feb. 1967. (e-7)

Boys scored significantly higher than girls on mathematics tests.

s; ---; 2-r; 1,800 students; 2.6, 3.5; grs. 8, 10; ---; norm.

Other References

Cronin, 1968	(a-4)
Davis, 1950	(c-20)
Houston, 1969	(a-4)
Howell, 1966	(c-13)
Howitz, 1966	(a-4)
Koehn, 1960	(f-2c)
Kohli, 1969	(f-2c)
McCutcheon, 1958	(f-2)
Simmons, 1966	(a-4)
Unkel, 1966	(e-7)

Socioeconomic differences (e-7)

Dreyfuss, Gerald Orange. A Study of a Special Educational Program for the Disadvantaged Student with a High Academic Potential. (University of Miami, 1968.) Dis. Abst. 29A: 3366; Apr. 1969. (e-2a)

Those in the special activity program achieved significantly higher test scores, though grades in mathematics were not different from those in the control group.

(I) activity program. (D) achievement.

e; 3.4; 2-s; ---; ---; jr. high; ---; norm, non-norm.

Johnson, Russell Marion. A Comparison of Gifted Adolescents from High and Low Socioeconomic Backgrounds on School Achievement and Personality Traits. (University of Denver, 1966.) Dis. Abst. 27A: 3226-3227; Apr. 1967. (e-3, e-5)

Few significant differences (on a variety of variables) were found between students from low and high socioeconomic environments.

f; ---; 2-s; 76 students; ---; gr. 12; ---; norm, non-norm.

Prichard, Paul Newton. The Effects of Desegregation on Selected Variables in the Chapel Hill City School System. (University of North Carolina at Chapel Hill, 1969.) Dis. Abst. 30A: 3697; Mar. 1970.

White students achieved significantly higher than Negro students, but there were no significantly negative effects of desegregation for either group. Significant positive changes in mathematics achievement were found in grades 5 and 7 for Negroes and in grade 5 for whites. Sex had little effect on mathematics achievement.

f; ---; 1-only; ---; ---; grs. 5, 7, 9; ---; norm.

Rasmussen, Dean Stewart. Urban Junior High School Mathematics Curricula at the Seventh and Eighth Grade Levels. (University of Southern California, 1968.) Dis. Abst. 29A: 1688; Dec. 1968. (ERIC Document No. ED 028 932)

Investigation found that curricular and instructional aspects of mathematics programs are interrelated with emphasis given to teaching for understanding and drill and other activities are used to reinforce concepts. Districts are in a transitional period in regard to many current trends related to these programs; an increase in in-service activities for teachers pertaining to general urban and mathematics education was also found.

s; ---; ---; ? students, 116 educators; ---; grs. 7, 8, in-service teachers; ---; ---.

Unkel, Esther Ruth. A Study of the Interaction of Socioeconomic Groups and Sex Factors with the Discrepancy Between Anticipated Achievement and Actual Achievement in Elementary School Mathematics. (Syracuse University, 1965.) Dis. Abst. 27A: 59; July 1966. (e-6, f-2c)

Significant differences in discrepancy scores were found for children in each of three socioeconomic groups in arithmetic reasoning, fundamentals, and totals. Significant differences between boys' scores and girls' scores occurred only in arithmetic fundamentals with girls' scores surpassing boys' scores from grade 6 through 8. An overall difference was found in the interaction of sex by grade level in arithmetic totals, although no significant difference was found at any given grade level.

f; ---; 2-s; ---; 3.2; grs. 1-9; ---; norm.

Other References

Anderson, 1959	(f-2)
Cragg, 1967	(e-6)
Dunson, 1970	(b-3)
Garner, 1963	(f-4)
Houston, 1969	(a-4)
Mahaffey, 1969	(f-4)
Pieters, 1969	(f-1a)
Snellgrove, 1961	(e-2a)
Winzenread, 1970	(d-5)

Testing (f-1)

Poppen, Henry A. A Factor-Analysis Study of Prognostic Tests in Algebra. (George Peabody College for Teachers, 1950.) (c-22, f-2c)

Other References

Glennon, 1948	(f-2)
Treacy, 1960	(a-6)

Aijaz, Saiyid Mohammad. Predictive Validity of the Three Versions of the "Verbal Reasoning" and the "Numerical Ability" Subtests of the Differential Aptitude Tests for East Pakistan. (Colorado State College, 1963.) Dis. Abst. 24: 1068-1069; Sept. 1963. (a-7)

The translated and the adapted versions of the Numerical Ability subtest had greater predictive validity than the English version.

r; ---; 1-only; 295 students; 6.4; grs. 10-12; ---; ---.

Baroya, George Manoranjan. Reliability, Validity, and Comparability of Forms L and M of the "Verbal Reasoning" and the "Numerical Ability" Subtests of the Differential Aptitude Tests. (Colorado State College, 1966.) Dis. Abst. 27A: 2865-2866; Mar. 1967. (a-7)

Some of the numerical ability subtests were found to be reliable and valid for boys but not for girls.

r; ---; ---; 376 students; 6.4; grs. 8-10; ---; ---.

Bernabei, Raymond. A Logical Analysis of Selected Achievement Tests in Mathematics. (Western Reserve University, 1966.) Dis. Abst. 27A: 4121-4122; June 1967. (d-9)

A systematic approach to the analysis of standardized achievement tests using Bloom's Taxonomy and a comparison with goals of the SMSG program was presented.

d; ---; ---; ---; ---; grs. 7, 8; ---; norm.

Connolly, Austin Jay. An Instrument of Measurement to Appraise the Arithmetic Abilities of Educable Mentally Retarded Children Ages Thirteen Through Sixteen. (Colorado State College, 1968.) Dis. Abst. 29A: 1034; Oct. 1968. (ERIC Document No. ED 025 434) (e-2c)

An individual test requiring no reading or writing was found to have a reliability of .97. Correlations with the Iowa Tests of Basic Skills were .38 for total scores and .69 for reasoning scores.

r; ---; 1-only; 428 students; 6.4; ages 13-16; ---; ---.

Analysis and validation of tests (f-1a)

Erickson, Gerald Lawrence. Junior High School Pupils' Attitudes Toward Mathematics as a Predictor of Senior High School Scholastic Achievement. (University of Minnesota, 1962.) Dis. Abst. 23: 529-530; Aug. 1962. (a-6, f-2c)

Centroid factor analysis was found to be the most satisfactory method of summarizing attitude scale data. (No data for students are cited.)

r; ---; 1-only; 310 students; 3.9, 6.1; gr. 11; ---; ---.

Esser, Barbara Feller. The Changing Relationship Between Verbal and Quantitative Aptitudes as Measured by the Scholastic Aptitude Test. (Rutgers - The State University, 1969.) Dis. Abst. 30A: 3780-3781; Mar. 1970.

While item analyses revealed that there is a slight increase in verbal difficulty in mathematics sections and in mathematical reasoning in verbal sections of the SAT, with both sections evolving in a similar direction, it appeared that increasing correlation of the two may be due to a change within candidates rather than the test.

d; ---; ---; ---; ---; gr. 12; ---; ---.

Evans, Edward William. Measuring the Ability of Students to Respond in Creative Mathematical Situations at the Late Elementary and Early Junior High School Level. (The University of Michigan, 1964.) Dis. Abst. 25: 7108-7109; June 1965. (g-4)

Developed tests were found to provide a measure of creative ability in mathematics. Performance was not dependent on grade or age, but was related to IQ.

s; ---; 1-only; ---; ---; grs. 5-8; ---; non-norm.

Ferguson, Elizabeth Muriel Jane. The Design of an Observational Instrument for the Description of the Algebra Classroom in the Light of Selected Aims--Indexed by Behaviors--of Secondary School Mathematics Teaching. (Washington University, 1957.) Dis. Abst. 17: 2220-2221; Oct. 1957. (c-22, t-2d)

With the developed instrument, the order of emphasis of aims classified under ability to think, appreciation of mathematics, and attitude of curiosity and initiative was determined.

s; ---; 1-only; ---; ---; gr. 9; ---; ---.

Futcher, Wilfred George. Scoring for Partial Knowledge in Mathematics Testing; A Study of a Modification and an Extension of Multiple-Choice Items Applied to the Testing of Achievement in Mathematics. (University of Toronto, 1969.) Dis. Abst. 31A: 1619-1620; Oct. 1970.

Partial-knowledge scoring methods were found to be more discriminating and reliable than the conventional right-wrong method. Extended format in which multiple choice was offered at several stages, was recommended.

(I) varying forms of test. (D) discrimination; validity; reliability.

e; 3.15; 2-s, 3-m, r; 293 students; 2.1; gr. 11; ---; non-norm.

Gupta, Ram Krishna. Interactions of Achievement Test Items in the Context of Repeated Measurements of Groups, Using Different Mathematics Texts. (University of Minnesota, 1967.) Dis. Abst. 28A: 2093-2094; Dec. 1967. (d-1)

Analyses of student responses to groups of items indicated differences or interactions between items, teachers, texts, and sexes.

(I) type of textbook. (D) interactions.

e; 3.27; 1-only; 513 students (30 classes); ---; gr. 9; ---; norm.

Kline, William Edward. A Synthesis of Two Factor Analyses of Intermediate Algebra. (Princeton University, 1960.) Dis. Abst. 21: 3516-3517; May 1961. (c-22)

Five congruent factors from 38 tests were identified: verbal comprehension, deductive reasoning, algebraic manipulative skill, number ability, and adaptability to a new task.

r; ---; ---; 152 students; 6.1; gr. 10; ---; norm, non-norm.

Analysis and validation
of tests (f-1a)

Leaf, Curtis T. The Construction and Tentative Standardization of Two Semester Achievement Examinations in Business Arithmetic. COSC 2: 33-36; 1940. (c-30)

Tests on business arithmetic were constructed and shown to be satisfactory.

r; ---; ---; ---; 1.3, 1.4, 1.8, 1.10; sec.; ---; ---.

Miller, Isabel Maria. Construction and Evaluation of a Reasoning Test in Plane Geometry. (University of Colorado, 1963.) Dis. Abst. 24: 4586; May 1964. (c-23)

The 50-item test was found to have reliability coefficients ranging from .59 to .77 (KR-20).

d; ---; ---; ---; ---; gr. 10; ---; non-norm.

Namkin, Sidney. The Stability of Achievement Test Scores: A Longitudinal Study of the Reading and Arithmetic Subtests of the Stanford Achievement Test. (Rutgers - The State University, 1966.) Dis. Abst. 27A: 398-399; Aug. 1966.

Relatively high level of stability between successive achievement tests (between grades 2 and 8) was found. A steady increase on variability occurred with increasing grade levels. Differences in patterns appeared between reading and arithmetic subtests, among subtests themselves, and also by sex.

r; ---; ---; 320 students; 6.4; gr. 9; ---; ---.

Nealeigh, Thomas Richard. Development and Validation of a Non-Verbal Attitude and Achievement Index for Mathematics. (The Ohio State University, 1967.) Dis. Abst. 28A: 3567; Mar. 1968. (a-6)

Positive correlation was found between tendency to select one of two pictures involving mathematical concepts and successful achievement or positive attitude toward mathematics.

r; ---; 1-only; 335 students; 6.4; grs. 3, 7; ---; ---.

Pieters, Gerald Ross. Pictorial Rote Learning as a Predictor of Remedial Academic Criteria. (Southern Illinois University, 1968.) Dis. Abst. 29B: 3123; Feb. 1969. (e-7)

While order and pacing were found to be significant effects, and type of (rote) learning was not significant in predicting achievement in English and mathematics, use of pictorial rote learning tests did not appear promising.

(I) two types of rote learning; method of pacing. (D) achievement.

e; 3.4; 2-s; 75 students; 3.2, 3.13; sec.; ---; non-norm.

Prouse, Howard L. The Construction and Use of a Test for the Measurement of Certain Aspects of Creativity in Seventh-Grade Mathematics. (State University of Iowa, 1964.) Dis. Abst. 26: 394; July 1965. (g-4)

The correlation between IQ and creativity score on the development test was .48, while correlations between fluency and originality on divergent thinking items was .76.

r; ---; 1-only; 312 students (14 classes); 6.4; gr. 7; ---;

non-norm.

Pruzek, Robert Marshall. A Comparison of Two Methods for Studying Test Items. (The University of Wisconsin, 1967.) Dis. Abst. 28A: 3035; Feb. 1968.

A method of categorizing test items was used with a mathematics test (CEEB).

d; ---; ---; ---; 6.1; sec.; ---; norm.

Romberg, Thomas Albert. Derivation of Subtests Measuring Distinct Mental Processes Within the NLSMA Algebra Achievement Test. (Stanford University, 1968.) Dis. Abst. 29A: 419; Aug. 1968. (c-22, d-9)

Three scaling methods were used to derive subtests of general mental processes associated with mathematics.

r; ---; ---; ---; 2.2, 6.4; gr. 9; ---; ---.

Analysis and validation
of tests (f-1a)

Sabers, Darrell Lee. A Study of the Predictive Validity of the Iowa Algebra Aptitude Test for Prognosis in Ninth Grade Modern Mathematics and Traditional Algebra. (The University of Iowa, 1967.) Dis. Abst. 28A: 2919-2920; Feb. 1968. (c-22)

The IAAT was found to be a highly reliable and valid instrument for prognosis; the ITBS (Iowa Test of Basic Skills) score can be effectively used either alone or in addition to IAAT.

r; ---; 2-s; 1,943 students; 6.3; gr. 9; ---; norm.

Turner, Marguerite Elizabeth. Construction, Validation, and Use of a Test for Measuring the Concept of Shape in Grades One Through Nine. (The University of Connecticut, 1961.) Dis. Abst. 22: 2701-2702; Feb. 1962. (c-8)

Significant positive relationships were found between possession of the concept of shape and both CA and MA, but not sex.

s; ---; ---; ---; 3.2, 3.3; grs. 1-9; ---; non-norm.

Walker, Charles Everett. The Effect of Variations in Test Administration Conditions on Arithmetic Test Performance. (The University of Rochester, 1969.) Dis. Abst. 31A: 242-243; July 1970.

No difference in scores on a computation test due to variations in the use of separate answer sheets, scrap paper, and test booklets was found. Study attitudes were found to be related to answer mode, but scholastic ability and study habits were not differentiating factors.

(I) four testing procedures. (D) achievement.

e; 3.19; 1-only; 388 students; 3.2; gr. 7; ---; non-norm.

West, Anita S. Wolfe. Development of a Computer-Administered Diagnostic College Placement Test in Mathematics. (University of Denver, 1969.) Dis. Abst. 30B: 5154-5155; May 1970. (d-6b, e-1b, p-2)

The computer-administered test (r = .93) was found to have a correlation of .59 with S.A.T. Math scores and GPA. Diagnosis, instant scoring and reporting of results, and ease of administration and of revision were cited as advantages.

r; ---; ---; 580 students (4 sec. schools, 2 colleges); 2.6, 6.4; gr. 12, college; ---; ---.

Other References

Ali, 1967	(a-7)
Badger, 1957	(c-23)
Deshpande, 1969	(e-2c)
Ellingson, 1962	(a-6)
Fey, 1969	(t-2d)
Flora, 1970	(t-1b)
Hammond, 1963	(c-3)
Ikeda, 1965	(f-4)
Kennedy, 1964	(t-1)
Massie, 1968	(t-1a)
Rappaport, 1958	(a-4)
Roberge, 1969	(c-13)

Status testing (f-1b)

Brand, Werner. Competencies Possessed by Secondary School Students and College Students in Arithmetical Fundamentals and Verbal Problems. COSC 14: 8-11; 1952. (a-5, c-3, c-20, f-2b, p-1, t-1a, t-1b)

Improvement in ability to compute and to solve verbal problems occurred in grades 7 and 8, while forgetting occurred in high school; college freshmen scored higher than twelfth graders, and teachers scored higher than college seniors.

s; ---; 1-only; 1,286 students; 1.6, 3.4, 5.2, 6.4; grs. 7-12,

college students, in-service teachers; ---; non-norm.

Brown, Robert Carl. Functional Competence in Mathematics of Louisiana High School Seniors. (George Peabody College for Teachers, 1956.) Dis. Abst. 17: 861-862; Apr. 1957. (c-20, e-1a)

Weaknesses in functional competences and errors in computation were listed. Indices of achievement were low.

s; ---; 2-s; 28 schools; 1.6; gr. 12; ---; norm, non-norm.

Crawford, Douglas Houston. An Investigation of Age-Grade Trends in Understanding the Field Axioms. (Syracuse University, 1964.) Dis. Abst. 25: 5728-5729; Apr. 1965. (c-2, f-2a)

Mean scores on tests of axiomatic structures increased with grade level. Students who had had modern programs scored higher than those in regular programs.

f; ---; 2-s; 1,000 students; 1.6; grs. 4, 6, 8, 9, 10, 12; ---;

non-norm.

Hoshauer, John C. The Effect of the Number and Type of Mathematics Courses Pursued in High School Upon Adequate Mastery of or Competence in the Fundamental Mathematical Processes. PSU 10: 171-178; 1947.

Scores increased as number of mathematics courses increased. Employers felt that high school graduates did not have an adequate level of competence, with speed and accuracy in computation as the most serious weakness.

s; ---; 1-only; approximately 1,000 persons; 1.1, 1.4, 6.4; sec., adult; ---; norm, non-norm.

Leonard, Harold A. Difficulties Encountered by Elementary Algebra Students in Solving Equations in One Unknown--A Diagnosis of Errors and a Comparison After Forty Years. (The Ohio State University, 1966.) Dis. Abst. 27A: 3778; May 1967. (a-1, c-22)

The 1966 algebra students obtained significantly better results in solving equations also attempted by a group in approximately 1926.

s; ---; 1-only; 2,430 students; ---; gr. 9; ---; ---.

Pruett, Rolla Francis. The Achievement in Mathematics and Science of Ninth-Grade Pupils in the Schools of Indiana. (Indiana University, 1960.) Dis. Abst. 21: 505; Sept. 1960.

Items relating to fractions and decimals were easiest while items relating to exponents and roots were most difficult.

s; ---; 1-only; 44,649 students; 1.1, 1.6, 1.9; gr. 9; ---; norm.

Renner, John W. Relationships Between Instructional Provisions and Functional Competence in Mathematics of Iowa High School Seniors. (State University of Iowa, 1955.) Dis. Abst. 15: 1188; July 1955. (c-20)

The correlation between achievement and functional competence was .63.

f; ---; 2-r; 1,227 students; 3.4, 3.5, 6.4; gr. 12; ---; norm.

Sligo, Joseph Richard. Comparison of Achievement in Selected High School Subjects. (State University of Iowa, 1955.) Dis. Abst. 15: 2136-2137; Nov. 1955. (a-1, c-22)

A significant decline in algebra achievement test scores was found between groups tested in 1934 and in 1954.

f; ---; ---; 2,300 students (1954); ---; gr. 9; ---; norm.

Status _testing_ (f-1b)

Other References

Beavers, 1970	(g-5)
Bush, 1959	(c-20)
Davis, 1950	(c-20)
Peak, 1955	(e-1a)
Sparks, 1960	(f-4)

Anderson, Tommie Marie. The Achievement in Mathematics and Science of Students in the Negro Schools and Colleges in Mississippi. (Indiana University, 1958.) Dis. Abst. 19: 2281; Mar. 1959. (e-7)

Students did not perform as well as the norm groups on standardized tests. Few (4) students were considered talented in mathematics.

s; ---; 1-only; 1,676 students; 1.1, 1.6; grs. 9, 12, college; ---;

norm.

Beckman, Milton William. The Level of Mathematical Competency and Relative Gains in Competency of Pupils Enrolled in Algebra and General Mathematics. (University of Nebraska, 1951.) (c-21, c-22)

Boles, Ralph C. Some Relationships Between Size of School and Academic Achievement of High School Seniors in Florida. (University of Florida, 1952.)

Butler, Charles H. Mastery of Certain Mathematical Concepts by Pupils at the Junior High School Level. (University of Missouri, 1931.)

Campbell, D. F. Factorial Comparison of Arithmetic Performance of Boys in Sixth and Seventh Grade. (Catholic University of America, 1956.)

DiPaolo, Nunzio Vincent. An Analysis of Some Identifiable Effects of the Educational Program of the Forbes Trail Area Technical School. (The Pennsylvania State University, 1965.) Dis. Abst. 27A: 654-655; Sept. 1966. (p-3)

Marks achieved in grades 11 and 12 did not differ from those in grades 9 and 10, but were not as high as those attained by a comparable group in an academic high school.

f; ---; 1-only; ---; ---; grs. 9-12; ---; ---.

Gallagher, Sister Marie T. A Study of the Mastery of Mathematical Concepts by Eighth Grade Pupils. (Fordham University, 1948.)

Achievement evaluation (f-2)

Glennon, Vincent Joseph. A Study of the Growth and Mastery of Certain Basic Mathematical Understandings on Seven Education Levels. (Harvard University, 1948.) (b-4, f-1)

Heshauer, John C. The Effect of Mathematics Courses Pursued in High School Upon Adequate Mastery of or Competence in the Fundamental Mathematical Processes. (Pennsylvania State University, 1948.) (c-20)

Holcombe, Bill Morgan. A Study of the Relationship Between Student Mobility and Achievement. (University of South Carolina, 1969.) Dis. Abst. 30A: 2253-2254; Dec. 1969.

No significant relationships were found between various mobility factors and achievement for the total sixth grade group, but arithmetic achievement by girls and by Negro pupils at both grade levels was negatively affected by attendance in many schools.

r; ---; 1-only; 446 students; 3.2, 3.5, 6.4; grs. 6, 9; ---; norm, non-norm.

Leonhardt, Earl Albert. An Analysis of Selected Factors in Relation to High and Low Achievement in Mathematics. (The University of Nebraska, 1962.) Dis. Abst. 23: 3689-3690; Apr. 1963.

Mathematical achievement, number of courses, and background of teachers were related to size of school.

r; ---; 2-r, s; 45 schools; 1.4, 1.6, 2.6, 3.2, 3.4, 5.2; grs. 9-12; ---; norm.

Loughren, Amanda. Pupil Growth Over a Period of Several Months in the Mastery of Certain Mathematical Concepts at the Junior High School Level: An Exploratory Investigation. (New York University, 1936.)

McCutcheon, George James. An Analytical Study of Achievement in Grade Eight General Science and in Grade Eight General Mathematics in Minnesota Public Schools. (University of Minnesota, 1957.) Dis. Abst. 18: 1306; Apr. 1958. (e-6)

Girls had higher mathematics mean scores than boys.

f; ---; 2-r; 85 schools (6,471 students, 378 teachers); 3.2, 3.3, 3.4, 3.5; gr. 8; 6 mos.; non-norm.

Meeker, Mary Nacol. Immediate Memory and Its Correlates with School Achievement. (University of Southern California, 1966.) Dis. Abst. 27A: 3727; May 1967. (g-2)

Auditory backward memory of digits was found to be related to marks of students who got A's or F's only in mathematics.

s; ---; 2-s; 150 boys; ---; gr. 9; ---; ---.

Ohlsen, Merle W. Control of Fundamental Mathematical Skills and Concepts by High School Students. (University of Iowa, 1946.)

Red, Samuel Bliss. A Factorial Study of Algebraic Abilities. (University of Texas, 1942.) (c-22)

Rusch, Carroll Ernest. An Analysis of Arithmetic Achievement in Grades Four, Six, and Eight. (The University of Wisconsin, 1957.) Dis. Abst. 17: 2217; Oct. 1957. (g-4)

The number factor was found to have three subfactors: abstraction, analysis and application. Girls developed the analysis and abstraction factors more clearly than boys.

r; ---; 1-only; 300 students; 6.1, 6.4; grs. 4, 6, 8; ---; norm.

Sears, Virginia M. Porter. A Study of the Evaluation of Learning in High School Algebra. (Columbia University, 1950.) (c-22)

Other References

Child, 1968	(e-2)	Schneider, 1970	(a-6)
Kohler, 1966	(d-8)	Schunert, 1951	(f-4)
Madden, 1966	(a-3)	Spickerman, 1970	(a-6)

Achievement evaluation:
Related to age (f-2a)

Stephany, Edward Oscar. Academic Achievement in Grades Five Through Nine. (Syracuse University, 1956.) Dis. Abst. 16: 1846; Oct. 1956.

No consistent differences were found between scores of modal-age groups and one-year-above-age-for-grade groups. Mean scores decreased with age within each grade.

r; ---; 1-only; 21,192 boys; 1.4, 6.1, 6.4; grs. 5-9; ---; norm.

Other References

Crawford, 1965	(f-1b)
Shronk, 1957	(f-2b)
Smith, 1959	(c-17)

Holowinsky, Ivan Zenovi. The Relationship Between Intelligence (80-110 I.Q.) and Achievement in Basic Educational Skills for a Selected Sample in Camden, New Jersey. (Temple University, 1961.) Dis. Abst. 22: 1509; Nov. 1961.

Significant, moderate relationships between mental potential and arithmetic achievement occurred up to age 15, and negligible but positive relationships were found after age 15. Students showed significantly better achievement in reading than in arithmetic, especially at lower IQ levels.

r; ---; 1-only; 375 students; 1.4, 3.3, 3.4, 5.2, 6.4; grs. 10-12;

---; norm.

Shronk, Eugene William. Relative Spread in Mental and Educational Level of Children Aged Nine to Fourteen Years. (Temple University, 1957.) Dis. Abst. 17: 2210-2211; Oct. 1957. (f-2a)

No significant increase in average range of scores (6 years, 3 months) was found with increasing age. In arithmetic, children were less variable in achievement than in mental maturity. Achievement ratios were higher for those of lower IQ.

f; ---; 1-only; 473 students; ---; ages 9-14 (grs. 4-8); ---; norm.

Strowbridge, Edwin David, Jr. Relationships Between Twelve Characteristics of Ability in Mathematics and Successful Achievement in an Eighth Grade SMSG Algebra Program. (University of Oregon, 1967.) Dis. Abst. 28A: 1014-1015; Sept. 1967. (ERIC Document No. ED 043 506) (d-9, f-2c)

Characteristics of ability were related to success in mathematics. Predictive and correlational data were cited.

r; ---; ---; 457 students; 3.13, 4.4, 6.4; grs. 7-9; ---; norm.

Achievement evaluation: Related to intelligence (f-2b)

Other References

Bachman, 1969	(a-3)
Brand, 1952	(f-1b)
Butler, 1956	(a-5b)
Cronin, 1968	(a-4)
Harte, 1967	(e-5)
Houston, 1969	(a-4)
Lavos, 1966	(e-5)
McLaughlin, 1970	(a-4)
Newmark, 1970	(d-5)
Robinson, 1969	(d-4)
Simmons, 1966	(a-4)
Sowder, 1970	(g-3)

Anglin, John Bennett. The Value of Selected Ninth Grade Tests and Algebra Grades in Predicting Success in Modern Geometry. (Indiana University, 1966.) Dis. Abst. 27A: 1696; Dec. 1966. (c-22, c-23)

The best single predictor for the degree of success in a modern geometry course was ninth-grade algebra grade point average. The type of algebra course (modern or traditional) was not significantly related to geometry success.

r; ---; 2-s; 279 students; 6.3, 6.4; gr. 10; ---; ---.

Babbott, Edward French. The Differential Effectiveness of Eight 9th Grade Variables in Predicting Success in Three 10th Grade Academic Subjects at Summit High School: A Study in Differential Prediction. (New York University, 1963.) Dis. Abst. 25: 993-994; Aug. 1964. (c-23)

The three most effective junior high school predictors of success in geometry were algebra I, IQ and general science for boys (.73), and algebra I, IQ, and social studies for girls (.72).

r; ---; 1-only; 600 students; 6.6; gr. 10; ---; norm.

Bowen, Collin Weldon. The Use of Self-Estimates of Ability and Measures of Ability in the Prediction of Academic Performance. (Oklahoma State University, 1968.) Dis. Abst. 30A: 978; Sept. 1969.

A self-estimate of ability scale was developed and found to extend the predictive validity of a standard test of academic aptitude.

r; ---; 1-only; 389 students; 6.3, 6.4; gr. 9; ---; norm, non-norm.

Caldwell, James Renwick. Structure-of-Intellect Factor Abilities Relating to Performance in Tenth-Grade Modern Geometry. (University of Southern California, 1969.) Dis. Abst. 31A: 212-213; July 1970. (c-23)

A set of structure-of-intellect tests was found to be an effective predictor of geometry performance, with algebra grades increasing the prediction coefficient. The tests were more effective for prediction than were commercial measures.

(I) structure-of-intellect scores; algebra grades; "commercial measures". (D) geometry achievement scores.

r; ---; 1-only; 322 students (2 schools); 6.2, 6.3; gr. 10; ---; norm.

Carlin, Francis X. Intelligence, Reading, and Arithmetic Scores as Predictors of Success in Selected Vocational High Schools. (Fordham University, 1962.) Dis. Abst. 23: 1241; Oct. 1962.

Differences in mean arithmetic scores between drop-outs and non-drop-outs were found to be significant and substantial. The arithmetic score was the best individual predictor of success in vocational school.

r; ---; ---; 906 boys; 6.4; high school; ---; ---.

Collins, Fred Esly. A Study of the Relative Importance of Certain Factors in Prediction of Successful Performance in Seventh Grade Mathematics. (Oklahoma State University, 1967.) Dis. Abst. 29A: 118; July 1968.

The best single predictor of success was found to be arithmetic problem solving and concepts, followed by numerical, arithmetic computation, and reading and language usage as determined by a regression procedure.

r; ---; ---; 508 students; 1.6, 3.13; gr. 7; ---; ---.

Duncan, Roger Lee. The Prediction of Success in Eighth Grade Algebra. (The University of Oklahoma, 1960.) Dis. Abst. 21: 1869; Jan. 1961. (c-22)

Four variables (IQ, interest scores in science and literature, an algebra prognosis test score, and grade placement in arithmetic computation) were found to be the best predictors of a student's score on an algebra test.

r; ---; ---; 2 classes; 3.13, 6.3, 6.6; gr. 8; ---; norm.

Hall, Lucien Talmage, Jr. The Prediction of Success in Each of Six Four-Year Selections of Secondary Mathematics Courses. (University of Virginia, 1969.) Dis. Abst. 30A: 4141-4142; Apr. 1970. (b-3)

For the sample studied, three predictor equations for success in mathematics courses were determined; marks from junior high were strong factors.

r; ---; 2-s; 193 students; 3.13, 6.4; grs. 7-11; ---; norm.

Holmes, William Frank. The Relationship Between Numerical-Verbal Ability and Educational and Vocational Interests. (University of Michigan, 1949.) Dis. Abst. 9: 80-81; Issue No. 2, 1949.

A relationship between numerical-verbal ability and educational-vocational interests was found; students were likely to be interested in the field in which they demonstrated strength.

r; ---; 1-only; ---; 2.6; gr. 12; ---; ---.

Johnson, Ellis. An Investigation of Prognosis in Algebra. (Fordham University, 1934.) (c-22)

Koehn, Edna Bertha. The Relationship of the Basic Skill Development of Sixth Grade Gifted Children to Ninth Grade Achievement in the Content Fields. (University of Minnesota, 1960.) Dis. Abst. 21: 133-134; July 1960. (e-3, e-6)

Sixth grade tests of basic skills were found to have predictive value for gifted students in grade 9. Boys achieved significantly higher than girls in mathematics.

r; ---; 2-s; 60 students; 1.5, 6.2, 6.4; gr. 9; ---; norm.

Kohli, Paul Eugene. An Analysis of Differential Aptitude Test Scores and Prediction of High School Academic Performance. (The University of Toledo, 1968.) Dis. Abst. 29A: 2528; Feb. 1969. (e-6)

About 78 per cent of the correlations between aptitude test scores and marks were significant; algebra marks were among these. Boys' correlations were more often significant than girls'.

r; ---; 2-s; 384 students; ---; grs. 8-12; ---; norm.

Achievement evaluation:
Related to prediction (f-2c)

Lewis, Vernon Chris. The Prediction of Academic Performance from Adolescent Attitude-Press Organizations. (Claremont Graduate School and University Center, 1968.) Dis. Abst. 29A: 2095-2096; Jan. 1969. (a-6)

The attitude-peer-press-organization variable increased predictability of academic performance in mathematics.

r; ---; 1-only; 227 students; 6.2; gr. 11; ---; non-norm.

Lovett, Carl James. An Analysis of the Relationship of Several Variables to Achievement in First Year Algebra. (The University of Texas at Austin, 1969.) Dis. Abst. 30A: 1470; Oct. 1969. (c-22)

Arithmetic achievement, initial algebra achievement, and other variables were found to be related to algebra achievement.

r; ---; 2-s; 858 students; 3.13; grs. 9, 10; ---; norm, non-norm.

Maclay, Charles Wylie, Jr. The Influence of Two Prerequisite Programs on Achievement in the High School Advanced Placement Calculus Course. (University of Virginia, 1968.) Dis. Abst. 29A: 3917-3918; May 1969. (d-9)

Students who had only three SMSG courses did not achieve well on the Advanced Placement Examination.

(I) three or five SMSG courses. (D) achievement in calculus.

f; ---; 2-s; ---; 2.6; gr. 12; 1 yr.; norm, non-norm.

Mars, Paul Arne. High School Geometry Achievement as Related to Reading Achievement, Arithmetic Achievement, and General Intelligence in the Public Schools of Lincoln, Nebraska. (The University of Nebraska, 1970.) Dis. Abst. 31A: 1691-1692; Oct. 1970. (c-23)

Correlations between geometry achievement and either arithmetic or reading vocabulary were not high enough to warrant use of either as major contributors to geometry achievement. Reading comprehension and IQ, however, were more highly related to geometric achievement.

r; ---; 2-r; 382 students (4 schools); 6.3; sec.; ---; norm.

Mazur, Joseph Lawrence. Validity of Scholastic Aptitude Scores as Predictors of Achievement. (Case Western Reserve University, 1968.) Dis. Abst. 30A: 171; July 1969.

When scores for boys and girls within a given socioeconomic group were compared, relationships between actual and predicted achievement were not significantly different.

r; ---; 2-s; 88 students; 3.2, 6.4; grs. 2-9; ---; norm.

Moore, Joseph Alvis. The Relationship of Certain Factors to Success in Ninth Grade Algebra. (University of Pittsburgh, 1944.) (c-22)

Orleans, Joseph B. A Study of Prognosis of Probable Success in Algebra and Geometry. (Teachers College, Columbia University, 1931.) (c-22, c-23)

Ralston, Nancy Carolina. A Study of the Advanced Placement Program in the Cincinnati Public Schools. (Indiana University, 1961.) Dis. Abst. 22: 3074-3075; Mar. 1962.

Mathematics and English Proficiency Test scores yielded the best results for multiple prediction of scores on the Advanced Placement Mathematics Examination.

r; ---; 1-only; ---; ---; sec., college; ---; norm.

Roach, Sister Mary Luke. A Study of the Efficiency of Certain Variables in Predicting Success in High School. (Fordham University, 1966.) Dis. Abst. 27A: 2075; Jan. 1967.

Arithmetic achievement scores contributed to predictions most for non-dropout boys.

r; ---; 1-only; 4,536 students; 1.4, 3.13, 6.2, 6.3; sec.; ---;

norm.

Achievement evaluation:
Related to prediction (f-2c)

Shull, Evan Dwain. A Comparison of Methods Used to Group High School Freshmen in Mathematics. (Colorado State College, 1966.) Dis. Abst. 27A: 2293; Feb. 1967. (e-4)

Students were placed more successfully in achievement level groups by using the composite subtest of the SRA Placement Test.

r; ---; 2-s, 3-r; 2 schools; 2.6, 6.4; gr. 9; ---; ---.

Whitcraft, Leslie H. Some of the Influences of the Requirements and Examinations of the College Entrance Examination Board on the Mathematics Requirements in the Secondary Schools of the U.S. (Teachers College, Columbia University, 1932.) (b-3, p-1)

Other References

Bailey, 1968	(e-4)
Davidson, 1969	(a-4)
Dirr, 1967	(g-4)
Erickson, 1962	(f-1a)
Farley, 1969	(a-6)
Fenner, 1966	(e-2a)
Heisey, 1966	(t-1b)
Ludeman, 1970	(e-3b)
Lyng, 1967	(t-2a)
Pollard, 1956	(e-5)
Poppen, 1950	(f-1)
Strowbridge, 1967	(f-2b)
Tucker, 1970	(b-2)
Unkel, 1966	(e-7)
Watson, 1970	(t-2a)

Burbank, Irvin Kimball. Relationships Between Parental Attitude Toward Mathematics and Student Attitude Toward Mathematics, and Between Student Attitude Toward Mathematics and Student Achievement in Mathematics. (Utah State University, 1968.) Dis. Abst. 30A: 3359-3360; Feb. 1970. (a-6)

Both parental attitudes were significantly correlated with students' mathematics attitudes. Students' attitudes correlated with achievement in mathematical reasoning, concepts, computations, and total scores.

r; ---; 1-only; 411 students; 6.4; gr. 7; ---; norm, non-norm.

Hipwood, Stanley James. Pupil Growth as a Function of Teacher Flexibility, Student Independence, and Student Conformance. (The University of New Mexico, 1968.) Dis. Abst. 30A: 169-170; July 1969. (f-4)

Independent students were not found to gain significantly in quantitative thinking when taught by highly flexible teachers.

(I) student independence and teacher flexibility levels.
(D) quantitative thinking score.

f; ---; 1-only; 394 students, 6 teachers; 3.3, 3.5; sec.; ---; norm.

Ilioff, Louie B. The Effect of Certain Teaching Practices Involving Systematic Home-School Cooperation Upon the Achievement of Eighth Grade Pupils in Mathematics. (The Pennsylvania State University, 1957.) Dis. Abst. 17: 2935; Dec. 1957. (a-2)

Parents' understanding of the mathematics program increased when the teacher made an effort to increase it, and resulted in better pupil achievement.

(I) systematic home-school cooperation or regular procedures.
(D) achievement.

e; 3.4; ---; 10 classes; ---; gr. 8; ---; norm.

Other References

Beaton, 1967	(e-2a)	Birr, 1969	(a-6)

Effect of teacher background (f-4)

Garner, Meridon Vestal. A Study of the Educational Backgrounds and Attitudes of Teachers Toward Algebra as Related to the Attitudes and Achievements of Their Anglo-American and Latin-American Pupils in First-Year Algebra Classes of Texas. (North Texas State University, 1963.) Dis. Abst. 24: 189; July 1963. (a-6, c-22, e-7)

Teachers' attitudes toward algebra were significantly related to the end-of-course attitudes of students, but not to achievement. Differences between the two groups of students were cited.

(I) teacher attitudes and backgrounds. (D) pupil attitudes and achievement.

f; ---; 2-s; 1,163 students, 45 teachers; 3.4; gr. 9; ---; norm,

non-norm.

Ikeda, Hiroshi. A Factorial Study of the Relationships Between Teacher-Held Objectives and Student Performance in UICSM High School Mathematics. (University of Illinois, 1965.) Dis. Abst. 26: 2588; Nov. 1965. (d-9, f-1a)

Some highly congruent factors were noted between teacher ratings of objectives and student pretest and posttest scores, but no factor of student gain scores was significantly congruent with teacher ratings. However, mean gain scores were positively related to mean teacher ratings.

r; ---; 2-s; 154 students, 105 teachers; 6.1, 6.4; gr. 9; ---;

non-norm.

Kester, Scott Woodrow. The Communication of Teacher Expectations and Their Effects on the Achievement and Attitudes of Secondary School Pupils. (The University of Oklahoma, 1969.) Dis. Abst. 30A: 1434-1435; Oct. 1969. (a-6)

Teachers communicated with allegedly bright pupils in a more friendly, encouraging, accepting manner. Students' achievement, IQ, and attitude were not significantly affected by teacher expectations, however.

(I) level of teacher expectation. (D) achievement; attitude.

e; 3.4; 2-s, 3-m; ---; ---; gr. 7; 9 wks.; non-norm.

Lichter, Solomon Sidney. Achievement in Reading and Arithmetic of the Pupils in a Junior High School as it is Affected by the Development and Use of a Behavioral Change Process. (New York University, 1964.) Dis. Abst. 25: 1049-1050; Aug. 1964.

A "behavioral change process" was encouraged; no significant gains in mathematics or reading scores were found.

a; ---; 1-only; 2 schools; 3.2; gr. 7; ---; norm, non-norm.

Mahaffey, Michael Lee. An Experimental Comparison of Students and Teachers in Culturally Deprived and Non-Culturally Deprived Schools in a Mathematics In-Service Training Program. (Southern Illinois University, 1968.) Dis. Abst. 29A: 2589-2590; Feb. 1969. (e-7, t-2b)

Students in both culturally and non-culturally deprived schools gained in achievement when teachers had an in-service program, but there were no differences in the scores of teachers in the two types of schools.

(I) in-service training; type of school. (D) achievement; attitude.

a; ---; ---; ---; ---; in-service teachers, grs. 3, 5, 7; ---;

non-norm.

McCardle, High Joseph. An Investigation of the Relationships Between Pupil Achievement in First-Year Algebra and Some Teacher Characteristics. (University of Minnesota, 1959.) Dis. Abst. 20: 165; July 1959. (a-6, c-22)

Gains on quantitative thinking and functional competence tests were significantly greater for classes whose teachers had high teaching attitude scores than for classes having teachers of middle or low attitude scores. No significant differences were found on an algebra achievement test.

f; ---; 2-s; 29 teachers, 1,643 students; 3.2, 3.5; gr. 9; 1 school

yr.; norm.

Effect of teacher background (f-4)

Neill, Robert Dudley. The Effects of Selected Teacher Variables on the Mathematics Achievement of Academically Talented Junior High School Pupils. (Columbia University, 1966.) Dis. Abst. 27A: 997-998; Oct. 1966. (d-9)

Of the teacher attributes (which in general contributed little) length of preparation contributed most to variance in students' scores. Scores were significantly higher in classes taught by men. SMSG-accelerated students achieved consistently higher than students in other programs.

f; ---; 1-only; 1,477 students (51 classes); ---; gr. 7; 1 yr.;

norm.

Peskin, Anne Stern. Teacher Understanding and Attitude and Student Achievement and Attitude in Seventh Grade Mathematics. (New York University, 1964.) Dis. Abst. 26: 3983-3984; Jan. 1966. (a-6)

In both arithmetic and geometry, significant positive correlations were found between teachers' understanding scores and students' achievement scores, but not between teachers' attitude scores and students' attitude or achievement scores.

s; ---; 2-s; 9 schools; 6.4; gr. 7; ---; non-norm.

Piatt, Robert George. An Investigation of the Effect the Training of Teachers in Defining, Writing and Implementing Educational Behavioral Objectives Has on Learner Outcomes for Students Enrolled in a Seventh Grade Mathematics Program in the Public Schools. (Lehigh University, 1969.) Dis. Abst. 30A: 3352; Feb. 1970.

Students whose teachers were trained to write behavioral objectives achieved significantly higher scores on subtests of computation and concepts than those whose teachers had no such training. No differences were found on the applications subtest. A more positive attitude toward the effectiveness of the untrained teachers was found, however.

(I) type of in-service program of teachers. (D) achievement of pupils.

e; 3.3; 3-r; 600 students (22 classes); 3.5; gr. 7; ---; norm,

non-norm.

Rouse, William Morrison, Jr. A Study of the Correlation Between the Academic Preparation of Teachers of Mathematics and the Mathematics Achievement of Their Students in Kindergarten Through Grade Eight. (Michigan State University, 1967.) Dis. Abst. 28A: 4031; Apr. 1968.

Low positive correlations between student's achievement and teacher's experience and high school preparation were found. A low negative correlation was also found between teacher's college mathematics preparation and total mathematics preparation, and student's achievement.

r; ---; 1-only; ---; 6.2; grs. K-8; ---; ---.

Schunert, Jim R. The Association of Mathematical Achievement with Certain Factors Resident in the Teacher, in the Teaching, in the Pupil, and in the School. (University of Minnesota, 1951.) (f-2)

Smith, Wallace Robert. The Achievement of Eighth-Grade Students in Arithmetic with Respect to Selected Patterns of Teacher Preparation. (The University of Oklahoma, 1964.) Dis. Abst. 25: 3947; Jan. 1965. (t-2d)

Differences in mathematics preparation of teachers had no apparent influence on the mean arithmetical achievement of students, but differences in professional-education preparation had a positive influence.

f; ---; 1-only; 28 classes; 3.2, 3.5; gr. 8; ---; norm.

Soeteber, Warren Harvey. Major-Minor Teaching Assignments and Related Pupil Achievement. (Colorado State College, 1969.) Dis. Abst. 30A: 4205; Apr. 1970. (c-22)

Students achieved more when taught by mathematics teachers with more than two years of experience, a high GPA, and above average knowledge.

r; ---; 1-only; 34 teachers, 1,930 students; 3.2, 6.4; gr. 9; ---;

non-norm.

Effect of teacher background (f-4)

Sparks, Jack Norman. A Comparison of Iowa High Schools Ranking High and Low in Mathematical Achievement. (State University of Iowa, 1960.) Dis. Abst. 21: 1481-1482; Dec. 1960. (b-3, f-1b)

In schools with high mathematics achievement scores, students took more mathematics and liked mathematics. Teachers had more experience, had taken more math courses, and seemed more competent.

f; ---; 2-s; 40 schools; 3.4; grs. 7-12; ---; norm.

Other References

Amidon, 1959	(a-4)
Bachman, 1969	(a-3)
Birr, 1969	(a-6)
Costantino, 1969	(a-3)
Hipwood, 1969	(f-3)
Phillips, 1970	(a-6)

Transfer (g-1)

[No dissertations were assigned to this category.]

Retention (g-2)

Hoffman, Carl Bentley. The Relationship of Immediate Recall, Delayed Recall, and Incidental Memory to Problem-Solving Ability. (University of Pennsylvania, 1960.) Dis. Abst. 21: 813-814; Oct. 1960. (a-5b)

Little relationship was found between immediate or delayed recall and problem solving, for good and poor achievers in problem solving. Incidental memory was found to be related.

r; ---; 2-s; 60 students; 6.4; gr. 8; ---; norm, non-norm.

Rushton, Edward Watson, Sr. A Study of Retention of Factual Knowledge of Mathematics by High School Students in Grades Nine Through Eleven. (George Peabody College for Teachers, 1962.) Dis. Abst. 23: 3914; Apr. 1963. (c-22, c-23, d-5)

The Algebra I group using programmed instruction with no help achieved significantly higher than those having conventional instruction, while in Algebra II those having conventional instruction scored significantly higher than those in either programmed instruction group. No differences were found with Geometry, nor were retention scores significantly different.

(I) conventional instruction or programmed instruction with or without teacher help. (D) achievement; retention.

e; 3.12 r; 1-only; 377 students; ---; grs. 9-11; 1 yr.; norm.

Schaaf, Oscar Frederick. Student Discovery of Algebraic Principles as a Means of Developing Ability to Generalize. (The Ohio State University, 1954.) Dis. Abst. 20: 225-228; July 1959. (a-4, c-22)

Use of student discovery procedures in an experimental algebra course improved ability to generalize in both mathematical and non-mathematical situations, with reasonable mastery of algebraic principles.

(I) experimental algebra course emphasizing discovery.
(D) achievement; ability to generalize.

a; ---; 2-s; ---; ---; gr. 9; 1 school yr.; norm, non-norm.

White, Annabel Lee. Retention of Elementary Algebra Through Quadratics After Varying Intervals of Time. (Johns Hopkins University, 1930.) (c-22)

Other References

Brownman, 1938	(a-4)
Meeker, 1967	(f-2)

Generalization (g-3)

Ebert, Reuben S. Generalization Abilities in Mathematics. (New York University, 1944.)

Rollins, James Hendrix. A Comparison of Three Stratagems for Teaching Mathematical Concepts and Generalizations by Guided Discovery. (University of Illinois, 1966.) Dis. Abst. 27A: 711-712; Sept. 1966. (a-4, c-23, d-5)

Results of the study provide little support for a position that any one of the stratagems studied is more effective than the others in promoting awareness of mathematical generalizations by high, average, or low ability students.

(I) three inductive stratagems; ability. (D) achievement.

e; 3.7; 2-s, 3-r; 191 students; 3.2; gr. 8; ---; non-norm.

Sowder, Larry Kenneth. Discovery Learning: A Status Study, Grades 4-7, and an Examination of the Influence of Verbalizing Mode on Retention. (The University of Wisconsin, 1969.) Dis. Abst. 31A: 86-87; July 1970. (b-5, f-2b)

Most pupils could form generalizations in the selected numerical situations, although students of lower IQ required more instances. The optimal grade level at which to offer generalizing tasks appears to be grade 6 or after.

s; ---; 2-s, 3-r; 72 students; 3.2, 6.2; grs. 4-7; 1 day (retention, 1 wk.); non-norm.

Other Reference

Retzer, 1967 (c-13)

Baughman, Gerald Don. Germane Material Criteria for Promoting the General Heuristic Cognitive Theme of the Cambridge Conference on School Mathematics. (Claremont Graduate School and University Center, 1967.) Dis. Abst. 29A: 506-507; Aug. 1968. (a-4, a-5b, d-9)

Five criteria for developing problem situations to promote strategies of thought and problem solving were cited.

d; ---; ---; ---; ---; grs. K-12; ---; ---.

Behr, Merlyn James. A Study of Interactions Between "Structure-of-Intellect" Factors and Two Methods of Presenting Concepts of Modulus Seven Arithmetic. (Florida State University, 1967.) Dis. Abst. 28A: 1698; Nov. 1967. (c-15, d-5)

Significant interaction was found between the two methods of instruction and (a) one figural factor and (b) four verbal factors.

(I) programs using verbal or figural mode. (D) achievement; retention.

e; 2.8 r; 2-s, 3-r; 228 students; 6.2; sec. (?); ---; ---.

Bree, David Sidney. The Understanding Process as Seen in Geometry Theorems. (Carnegie-Mellon University, 1969.) Dis. Abst. 30A: 1675; Nov. 1969. (c-13, c-23)

"Understanding" appeared to be composed of the simpler processes of consolidating, rephrasing, explaining, and predicting steps of the solution. Two profiles from the same subject were more similar than two from different subjects.

(I) "thinking aloud" process. (D) "understanding".

e; 3.21; 1-only; 12 students; ---; gr. ?; 1 day (retention, 1 wk.); ---.

Carnes, DuWayne Douglas. A Study of the Critical Thinking Ability of Secondary Summer School Mathematics Students. (The University of Mississippi, 1969.) Dis. Abst. 30A: 2242; Dec. 1969.

No one variable was found to be a significant predictor of change in critical thinking ability.

Thought processes (g-4)

(I) formal or no formal instruction on critical thinking.
(D) student and teacher critical thinking ability; age; class hours; IQ; sex.

e; 3.4; 1-only; 98 students; 3.3, 3.4, 6.2, 6.3; sec.; ---; non-norm.

Delidow, Stanley Victor. A Study of Inquiry and Conceptual Ideas at Selected Grade Levels. (Wayne State University, 1969.) Dis. Abst. 30A: 3710; Mar. 1970.

Upper grade pupils selected categories mostly on the basis of quantitative characteristics, lower grade pupils selected by qualitative judgments. Ability to predict and to experiment was age-related. Understanding of probability was observed only in grade 11.

s; ---; 2-s; 293 students; ---; grs. K, 2, 5, 8, 11; ---; ---.

Dirr, Sister Pierre Marie. Intellectual Variables in Achievement in Modern Algebra. (The Catholic University of America, 1966.) Dis. Abst. 27A: 2873-2874; Mar. 1967. (c-22, d-9, f-2c)

IQ was the best single predictor of success in algebra. Intellectual variables differed for boys and girls.

r; ---; 1-only; 4 schools; 3.13; gr. 9; ---; norm.

Fitzgerald, William Morley. A Study of Some of the Factors Related to the Learning of Mathematics by Children in Grades Five, Seven and Nine. (University of Michigan, 1962.) Dis. Abst. 23: 552-553; Aug. 1962. (c-9, c-11, c-14)

Overlap in achievement of concepts was found across grade levels.

r; ---; 1-only; ---; 6.4; grs. 5, 7, 9; ---; ---.

Friede, Karmi. Abstraction and Concept Formation in the Field of Secondary School Mathematics. (Columbia University, 1954.) Dis. Abst. 14: 1347-1348; Sept. 1954. (c-2)

Some students retained naive and primitive childhood understanding of some of the concepts (Zero, Equality, Relation, Identity, Equation). Responses were given in problematical situations; some terms were understood only in terms of certain contexts. Ability to abstract improved with age.

s; ---; 1-only; ---; ---; grs. 9-12; ---; ---.

Gadske, Richard Edward. Demonstrative Geometry as a Means for Improving Critical Thinking. (Northwestern University, 1940.) (c-23)

Henderson, Kenneth B. An Experiment in Teaching Solid Geometry to Provide Training in Thinking. (Ohio State University, 1946.) (c-23)

Henry, Lyle K. The Role of Insight in Plane Geometry. (University of Iowa, 1933.) (c-23)

Hodges, John Raymond. A Study of the Ability of a Group of Eighth Grade Students to Learn and Use Certain Mathematical Concepts. (George Peabody College for Teachers, 1963.) Dis. Abst. 24: 5430; June 1964. (b-4, c-9)

Instruction on a variety of concepts and terms resulted in better achievement on a unit on negative integers than that attained with instruction on topics such as taxation, banking, and the metric system.

(I) modern or traditional topics. (D) achievement.

e; 3.4; 2-s, 3-r; 63 students; 3.2; gr. 8; 20 days; non-norm.

Lewis, Harry. An Experiment in Developing Critical Thinking Through the Teaching of Plane Demonstrative Geometry. (New York University, 1950.) Dis. Abst. 10: 116-118; Issue No. 4, 1950. (c-23)

Geometry taught with emphasis on critical thinking resulted in increases in ability to think reflectively; achievement was comparable to that in a regular course.

a; ---; ---; ---; ---; sec.; ---; ---.

Thought processes (g-4)

Manley, Myron B. A Factor Analytic Study of Three Types of Concept Attainment Tasks. (Princeton University, 1966.) Dis. Abst. 27B: 600-601; Aug. 1966.

Communalities were found between different concept attainment tasks (many related to mathematics); however, these are restrictive and need further analysis.

r; ---; 1-only; 119 boys; 6.1, 6.4; gr. 9; ---; non-norm.

Meconi, LaVerne Joseph. An Experimental Study of Concept Learning and Retention in Mathematics. (The Ohio State University, 1966.) Dis. Abst. 27A: 2740-2741; Apr. 1967. (d-5)

A program of number sequences was developed with three approaches: (1) rule and example, (2) guided discovery, and (3) discovery. Differences in achievement were not significant; however, the discovery program appeared to be most effective in terms of time.

(I) expository, discovery, or guided discovery approach.
(D) achievement.

e; 2.4; 2-s, 3-r; 45 students; ---; grs. 8, 9; 2 days; non-norm.

Shumway, Richard James. The Role of Counterexamples in the Development of Mathematical Concepts of Eighth Grade Mathematics Students. (University of Minnesota, 1969.) Dis. Abst. 30A: 3368-3369; Feb. 1970. (c-13, c-30)

The class taught quadrilaterals, exponents and operations with both examples and counterexamples scored significantly higher than the class taught with examples only.

(I) use of counterexamples or only examples. (D) achievement.

e; 3.3; 2-s, 3-r; 4 classes (84 students); 3.2, 3.5; gr. 8; 65 periods; norm, non-norm.

Spraker, Harold Stephen. A Study of the Comparative Emergence of Creative Intellectual Behavior During the Process of Group and Individual Study of Mathematics. (University of Virginia, 1960.) Dis. Abst. 21: 2199-2200; Feb. 1961.

No significant differences in creativity scores were found among students who worked in groups or individually. Creativity and arithmetic achievement were correlated (.66), as were creativity and IQ (.59).

(I) level of ability; group or individual study. (D) creativity.

e; 2.8; 2-r, 3-r; 8 classes; 3.4, 3.5, 6.4; gr. 7; ---; non-norm.

Ulmer, Gilbert. Can the Teaching of Geometry Aid in Cultivating Reflective Thinking? (University of Kansas, 1939.) (c-23)

Williams, Charlotte Leverett. Divergent Production Characteristics of Academically and Artistically Gifted Adolescents. (University of Georgia, 1966.) Dis. Abst. 27A: 2412-2413; Feb. 1967.

Students gifted in mathematics had similar patterns of performance and were similar on divergent production to those gifted in other areas.

s; ---; 2-s; 403 students; ---; grs. 10, 11; ---; non-norm.

Thought processes (g-4)

Other References

Ballew, 1966	(a-4)
Callister, 1966	(e-5)
Cooney, 1970	(t-2b)
Corley, 1959	(c-13)
Evans, 1965	(f-1a)
Farrell, 1968	(c-23)
Holmes, 1966	(c-5)
Howell, 1966	(c-13)
Hrabi, 1968	(c-13)
Jackson, 1957	(c-22)
Kriegsman, 1964	(c-23)
MacPherson, 1967	(e-5)
Price, 1966	(a-4)
Prouse, 1965	(f-1a)
Roberge, 1969	(c-13)
Roberts, 1966	(d-1)
Robinson, 1964	(c-13)
Rosenfeld, 1958	(e-5)
Rusch, 1957	(f-2)
Scott, 1969	(d-5)
Smith, 1968	(c-12)
Treffinger, 1969	(d-5)
Volchansky, 1969	(a-4)
Wolfe, 1970	(c-8)

Beavers, Elizabeth Cassandra. The Effects of Certain Anxiety-Producing Techniques on Achievement Testing and Motivation in High School Geometry Classes. (The University of Oklahoma, 1970.) Dis. Abst. 31A: 1065; Sept. 1970. (c-23, f-1b)

Differential reactions to test-taking anxiety had a significant effect on test performance, with boys scoring significantly higher than girls, though high anxiety provocation significantly lowered scores for all four personality types.

(I) anxiety-arousal or normal testing condition; anxiety type; sex. (D) achievement.

e; 3.7; 2-s, 3-r; 80 students; 3.2; gr. 10; ---; norm.

Cromack, Norman Eugene. The Central Jersey Mathematics League: A Description and an Assessment of Its Effects as Judged by the Participants. (Rutgers University, 1965.) Dis. Abst. 27A: 410-411; Aug. 1966.

The contests were reported to generate desirable competitive spirit, but without overemphasis on winning. Increase of students' ability and confidence in problem solving was moderate, while an outlet was provided for enthusiasm.

s; ---; ---; 124 students, 26 teachers; ---; ---; ---; ---.

Entin, Elliot E. The Relationship Between the Theory of Achievement Motivation and Performance on a Simple and a Complex Task. (The University of Michigan, 1968.) Dis. Abst. 29B: 1160-1161; Sept. 1968.

No achievement differences were found between students who thought test results were to be shown to parents or kept confidential.

(I) two types of motivation; task difficulty. (D) achievement.

e; 3.4; 2-s, 3-s; 169 students; ---; grs. 7, 8; 1 day; non-norm.

Motivation (g-5)

Holtan, Boyd DeVere. A Comparison of Motivational Vehicles in Teaching General Mathematics Students. (University of Illinois, 1963.) Dis. Abst. 24: 198-199; July 1963. (c-2, c-21, d-5)

No significant differences in achievement between groups using one of four "motivational vehicles" were found. However, high interest related to the "vehicle" was effective in increasing mathematical achievement and retention.

(I) four motivational vehicles (automobile, farming, social utility, intellectual curiosity). (D) achievement; retention.

e; 3.1 r; 2-s, 3-m; 136 boys; 3.5; gr. 9; 2 days (retention, 3 wks.); ---.

Morgan, Kenneth Brown. A Plan for an Interscholastic Mathematics Contest in Westchester County. (Columbia University, 1947.) (d-3)

Parkinson, Daniel Smith. School Policy in Student Choices of Courses in High School Mathematics. (The University of Wisconsin, 1959.) Dis. Abst. 20: 927-928; Sept. 1959.

Almost twice as many students were taking algebra as were taking general mathematics (in the Wisconsin schools surveyed), with variability in programs related to the existence of a college-preparatory track. Parents as well as scores were important in influencing student choices of courses.

s; ---; 2-s; 166 schools; 1.6; grs. 9-12; ---; ---.

Rising, Gerald Richard. The Student Mathematics Journal Project: A Comparative Study of Intrinsic Interest in Mathematics of Selected High School Students. (New York University, 1965.) Dis. Abst. 27A: 999-1000; Oct. 1966. (d-9)

Higher ability students, students in lower school grades, and students using modern texts showed more interest in a set of enrichment publications.

f; ---; 2-s; 2,981 students (122 classes); ---; sec.; ---; ---.

Sawin, Enoch I. Motivation in Mathematics: Its Theoretical Basis, Measurement, and Relationships with Other Factors. (University of Chicago, 1951.)

Tiemens, Robert Kent. The Comparative Effectiveness of Sound Motion Pictures and Printed Communications for the Motivation of High School Students in Mathematics. (State University of Iowa, 1962.) Dis. Abst. 23: 2822; Feb. 1963. (c-22, d-4)

The use of three motivational films resulted in higher achievement only for boys than use of booklets or no special materials.

(I) use of two types motivational materials (films, booklets) or no special materials. (D) achievement.

e; 3.11; 2-s, 3-r; 550 students; 3.5; gr. 9; 1 semester; norm, non-norm.

Wilds, Elmer Harrison. Interschool Contests: The Reorganization and Redirection of Interschool Relationships in American Secondary Schools. (Harvard University, 1933.)

Reinforcement (g-6)

Feierabend, R. L. The Role of Reinforcement in the Acquisition of Word Meanings. (Yale University, 1955.)

Other References

Roberts, 1966	(d-1)
Wiebe, 1966	(d-5)

Beeson, Richard O'Neil, Jr. Immediate Knowledge of Results and Test Performance. (University of Arkansas, 1970.) Dis. Abst. 31A: 920; Sept. 1970.

There were no significant differences in the results of ten tests given with immediate or delayed knowledge of results, but immediate knowledge was significantly better on the final test. Test anxiety, attitude, and aspiration contributed most to prediction of test performance.

(I) immediate or delayed knowledge of results. (D) achievement.

e; 3.18; 1-only; 3 groups; 3.2, 6.2, 6.4; gr. 8, college; 11 days;

non-norm.

Ottina, John Renaldo. The Effects of Delay in Knowledge of Results on the Amount Learned in Teaching Machine Programs of Differing Cue Content. (University of Southern California, 1964.) Dis. Abst. 25: 1753; Sept. 1964. (c-22, d-5, d-6a)

No significant differences in achievement were found between groups as a result of delayed knowledge of results or high/low cue content.

(I) high or low cues; immediate or delayed knowledge of results.
(D) achievement.

e; 2.2; 2-s, 3-m; 60 students; 3.2; gr. 7; ---; non-norm.

Other References

Proctor, 1968	(a-5i)
Shaw, 1968	(a-5a)

Reinforcement:
Other procedures (g-6b)

[No dissertations were assigned with a primary reference to this category.]

Other References

Moser, 1966	(t-1d)
Steinen, 1967	(t-1b)

Miller, Charles K. The Relationship Between Piaget's Conservation Tasks and Selected Psycho-Educational Measures. (Temple University, 1969.) Dis. Abst. 31A: 1081; Sept. 1970. (e-2c)

Significant relationships were found between conservation tasks and between conservation and (1) mental ability, (2) achievement, and (3) age, for both mentally retarded and non-retarded groups.

r; ---; 2-r; 150 students; 3.2, 6.4; ages 6-18; ---; norm.

Other Reference

Needleman, 1970 (g-7d)

Conservation:
Development (g-7a-1)

[No dissertations were assigned to this category.]

Phillips, Darrell Gordon. An Investigation of Possible Hierarchical Dependency of Four Piaget-Type Tasks Under Two Methods of Presentation to Third-, Fifth-, and Seventh-Grade Children. (The Florida State University, 1967.) Dis. Abst. 28A: 2564; Jan. 1968. (d-3)

Significant differences in task attainment between grade levels were found, but no significant differences between the two types of presentation (object and graphic).

(I) type of presentation. (D) achievement.

e; 2.8; 2-s, 3-r; 120 students; 3.2, 4.8; grs. 3, 5, 7; 1 day; ---.

Conservation: Relation to achievement (g-7a-3)

[No dissertations were assigned to this category.]

Transitivity (g-7b)

[No dissertations were assigned to this category.]

Classification and seriation (g-7c)

[No dissertations were assigned with a primary reference to this category.]

Other Reference

Needleman, 1970 (g-7d)

Boe, Barbara Lamphere. A Study of the Ability of Secondary School Pupils to Perceive the Plane Sections of Selected Solid Figures. (The University of Wisconsin, 1966.) Dis. Abst. 28A: 387; Aug. 1967. (c-23, c-30)

Few of the students were able to describe the effect of sectioning all 16 geometrical figures. Ability level and sex, but not grade level, were found to be significant.

f; ---; 2-r; 72 students; 3.2; grs. 8, 10, 12; ---; non-norm.

Golledge, Margaret Ruth. The Development of Piaget-Type Formal and Concrete Reasoning. (The University of Iowa, 1966.) Dis. Abst. 27A: 673-674; Sept. 1966.

Many students below age 16 had not mastered either formal or concrete reasoning although improvement was evident with age. The formal reasoning scores progressed in a way consistent with Piaget's theory, but concrete reasoning items appeared to be more difficult than he described.

s; ---; 1-only; ---; 3.4; grs. 5-9; ---; non-norm.

La Crosse, Jean E. The Relationship Between Piagetian Stage of Spatial Concept Development and Rod-and-Frame Test Performance. (The University of North Carolina at Chapel Hill, 1966.) Dis. Abst. 27B: 2871-2872; Feb. 1967.

Pupils "unsophisticated" in spatial concepts were less successful in solving the construction tasks.

s; ---; 1-only; 90 students; ---; ages 6, 8, 10, 12, 14; ---;

non-norm.

Leskow, Sonia. Developmental Changes in Children's Understanding of Permutation. (Puedue University, 1968.) Dis. Abst. 29B: 3107-3108; Feb. 1969. (c-30)

Strong support was found for Piaget's use of the mathematical group as a model for the cognitive structures underlying permutation skills: effects of age were reliable.

f; ---; 1-only; 96 students; 3.2; ages 12, 15, 18; ---; ---.

Piagetian concepts:
Other (g-7d)

Needleman, Joan Rines. Scalogram Analysis of Certain Area Concepts Proposed by Piaget. (Boston University School of Education, 1970.) Dis. Abst. 31B: 3030-3031; Nov. 1970. (g-7a, g-7c)

A developmental scale of space and measurement concepts prerequisite to understanding rectangular area and its computation was found to exist, with a significant relationship between acquisition of the concept of area and that of operational continuity.

s; ---; 1-only; 69 boys; 1.6, 4.8; grs. 3-8 (ages 8-14); ---; ---.

Other References

Davis, 1970	(c-11)
Farrell, 1968	(c-23)
Palow, 1970	(c-11)

Kennedy, Joseph Wilson. The Development of a Test of Skill in Solving Mathematics Teaching Problems. (Indiana University, 1963.) Dis. Abst. 24: 3202-3203; Feb. 1964. (c-22, f-1a, t-2)

Mean scores on a test using tape recordings of simplified teaching situations increased as amount of background increased.

s; ---; 1-only; 311 teachers; 3.2; pre- and in-service in gr. 9;

---; non-norm.

Pre-service: Competency levels (t-1a)

Dixon, Billy Gene. Mathematical Concepts That a Teacher of the First Two Years of Secondary School Algebra Must Understand in Order to Effectively Use the "New Mathematics" Curriculum Materials. (Southern Illinois University, 1967.) Dis. Abst. 28A: 3551-3552; Mar. 1968. (c-22)

A difference of opinion related to the minimal understanding necessary for teacher effectiveness was found to exist between textbook authors and teachers. Recommendations for additional courses stressing concepts found desirable were made.

s; ---; 1-only; ---; 1.6; pre-service in grs. 9, 10; ---; non-norm.

Martin, Bernard Loyal. Spatial Visualization Abilities of Central Washington State College Prospective Elementary and Secondary Teachers of Mathematics. (Oregon State University, 1966.) Dis. Abst. 27A: 2427-2428; Feb. 1967. (ERIC Document No. ED 020 126) (c-11, c-23, t-2a)

Spatial visualization abilities of pre-service secondary teachers differed significantly from those of pre-service elementary teachers. Differences were also found between pre- and in-service levels.

f; ---; ---; ---; 3.3, 3.5; pre- and in-service in grs. K-12; ---; ---.

Massie, Ronald Owen. The Construction and Use of a Test to Evaluate Teacher Preparation in Modern Mathematics. (The University of Nebraska Teachers College, 1967.) Dis. Abst. 28A: 4027-4028; Apr. 1968. (f-1a, t-2a)

Variability in preparation was found; students with student-teaching experience and experienced teachers scored higher.

s; ---; 2-s; 273 students, 58 teachers; ---; pre- and in-service; ---; non-norm.

Pre-service: Competency levels (t-1a)

Other References

Anttonen, 1968	(a-6)
Brand, 1952	(f-1b)
Cook, 1970	(t-2a)
Olsen, 1969	(b-3)

Pre-service: Preparation procedures (t-1b)

Barbeau, Alice Mae. A Historical Approach to the Theory of Groups. (The University of Wisconsin, 1968.) Dis. Abst. 29B: 4737; June 1969. (a-1, c-23, t-2b)

Materials on the origin and theory of groups, and applications of groups to geometry were developed.

d; ---; ---; ---; ---; pre- and in-service; ---; ---.

Berg, Milton Edward. A Plan for the Mathematical Education of Teachers of Secondary School Mathematics in the State of Oklahoma. (Columbia University, 1964.) Dis. Abst. 26: 207; July 1965. (a-1)

Eight recommendations for changes in the mathematics education of prospective teachers were developed.

d; ---; ---; ---; ---; pre-service; ---; ---.

Boyer, Lee Emerson. College General Mathematics for Prospective Secondary School Teachers. PSU 2: 132-138; 1939.

Topics considered important in mathematics courses for teachers were ascertained.

s; ---; ---; ---; ---; pre-service; ---; ---.

Buckland, Golden T. Development of a Plan for Mathematics Education at the Appalachian State Teachers College: (Five Years Leading to M.S. in Mathematics Education). PSU 17: 255-259; 1954. (b-3)

No college was found which offered programs leading to B.S. and M.S. degrees in mathematics education; a course of study for such a program was developed.

s; ---; 2-r; 393 schools; ---; pre-service; ---; ---.

Chavier, Rosalind Roper. The Undergraduate Course in Methods of Teaching Secondary School Mathematics. (Columbia University, 1964.) Dis. Abst. 25: 5134-5135; Mar. 1965. (b-3)

A methods course was developed which attempts to show the interdependency of objectives, methods, material and evaluation, as well as create a positive attitude.

s; ---; 2-s; 83 colleges; ---; pre-service; ---; ---.

DiPietro, Alphonso Joseph. A Program in Mathematics Education for West Virginia Teachers of Secondary Mathematics. (George Peabody College for Teachers, 1956.) Dis. Abst. 17: 569; Mar. 1957.

Content of a mathematics program including at least 32 hours of course work were determined.

d; ---; ---; ---; ---; pre-service; ---; ---.

Donovan, Sister Mary Matthew. A Study of Selected Data Relative to the Education of Texas Teachers of Secondary School Mathematics in Order to Suggest a Program for Their Future Education. (University of Houston, 1956.) Dis. Abst. 16: 1228-1229; July 1956. (t-2c)

Teachers, administrators, and college professors recommended that the preparatory program include emphasis on a broad general education, development of good citizens, and applied rather than pure mathematics.

s; ---; 2-s; 251 educators; ---; pre- and in-service; ---; ---.

Evans, John James. A Critical Analysis of Procedures for Evaluating Student Teachers in Secondary Mathematics. (The Ohio State University, 1953.) Dis. Abst. 20: 2824-2827; Jan. 1960.

Guiding principles and conclusions related to self-evaluation, pupil evaluation, evaluation by supervising teachers and by college supervisors are listed. Three evaluation instruments are also described.

s; ---; 2-s; 256 colleges; 1.6; pre-service; ---; ---.

Flora, Ben Vivian, Jr. Development of an Instrument for Assessing Teacher Behavior Characteristics of Teachers of Secondary School Mathematics. (The Ohio State University, 1969.) Dis. Abst. 31A: 662-663; Aug. 1970. (f-1a, t-1d, t-2d)

The instrument provided scores which differentiated between highly and minimally effective teachers; it could be used to predict success in student teaching or to indicate specific needed changes in teaching behaviors.

Pre-service: Preparation
procedures (t-1b)

r; ---; ---; ---; ---; pre- and in-service; ---; ---.

Ford, Patrick L. The Mathematics Included in Programs for the Education of Secondary School Teachers in the Southern Association. (University of Missouri, 1962.) Dis. Abst. 23: 543; Aug. 1962.

Pre-service teachers were being taught content pertinent to both traditional and modern programs, but were not given enough familiarity with modern programs and with geometry.

s; ---; ---; 52 colleges; ---; pre-service; ---; ---.

Heisey, Daniel Joseph. A Characterization of Provers and Nonprovers in an Axiomatic Geometry Course for Elementary Education Majors: A Discriminate Analysis. (Purdue University, 1966.) Dis. Abst. 27A: 413-414; Aug. 1966. (c-13, f-2c)

Tests which would predict "provers" and "non-provers" were determined.

r; ---; 2-s; 58 students; 3.12; pre-service; ---; norm, non-norm.

Howe, Parshall Lyndon. A Study of the Effectiveness of the Curricula of the California State Colleges as a Pre-Service Preparation to Teach Algebra I and Geometry. (Oklahoma State University, 1966.) Dis. Abst. 27A: 4154-4155; June 1967. (c-22, c-23, t-2c)

A major rather than a minor in mathematics was considered to prepare more effectively for teaching modern courses. Fifty-eight of 126 topics were rated as essential in the preparation of teachers.

s; ---; 2-s; ---; 2.11; pre-service; ---; ---.

Howell, Daisy Loden. The Development of an Instructional Guide for a Methods Course in Secondary School Mathematics. (The University of Mississippi, 1969.) Dis. Abst. 30A: 1050; Sept. 1969.

A postulational approach was used in developing the guide, consisting of six resource units.

d; ---; ---; ---; ---; pre-service; ---; ---.

Mock, Gordon Duane. The Development of Methods Courses in Teaching of Mathematics Since 1890. (The University of Wisconsin, 1959.) Dis. Abst. 20: 2156-2157; Dec. 1959. (a-1, d-1)

Topics included in methods textbooks were analyzed.

d; ---; ---; 10 textbooks; ---; in-service; ---; ---.

Osborne, Edmund Cole. A Comparison of Two Curriculums for the Preparation of Teachers of Mathematics in Secondary Schools and of the Students Trained Under Each. (Boston University School of Education, 1956.) Dis. Abst. 16: 1409-1410; Aug. 1956. (b-4)

The 1928-1940 preparatory curriculum met specified criteria better than the post-1940 curriculum, but students trained under the post-1940 were considered superior.

d; ---; ---; ---; ---; pre-service; ---; ---.

Phillips, Orval Lewis. A Proposed Program for the Training of Mathematics Teachers for the Public Secondary Schools of Mississippi. (Columbia University, 1950.)

Rine, Toivo E. Criteria for Self-Evaluation of Programs of Student Teaching in Secondary School Mathematics. (George Peabody College for Teachers, 1952.)

Schumaker, John Abraham. Trends in the Education of Mathematics Teachers: A Study of the Education of Senior High School Mathematics Teachers in Selected Teacher Education Institutions in the United States in the Period 1920-1958. (New York University, 1959.) Dis. Abst. 20: 4044-4045; Apr. 1960. (a-1)

An increased number of courses is now required for teachers. Little influence of recommending committees was found.

s; ---; 2-s; 314 dept. heads; ---; pre-service; ---; ---.

Pre-service: Preparation procedures (t-1b)

Shafer, Dale Marks. The Development and Testing of Subject Matter for a Course in Methods of Teaching Secondary School Mathematics. (The University of Oklahoma, 1967.) Dis. Abst. 28A: 1722-1723; Nov. 1967.

A three semester-hour methods course was formulated based on the rating of 37 topics by educators.

s; ---; ---; 200 math educators; ---; pre-service; ---; ---.

Shouk, Mahmoud Ahmed Ali. A Program for Pre-Service Education of Mathematics Teachers for the Secondary Schools of the U.A.R. (Columbia University, 1965.) Dis. Abst. 27A: 132; July 1966. (a-7)

Following examination of pre-service mathematics programs in the U.A.R., a program was prepared.

d; ---; ---; ---; ---; pre-service; ---; ---.

Shuler, Caroline Eucebia. The Professional Treatment of Freshman Mathematics in Teachers Colleges. (George Peabody College for Teachers, 1933.)

Slack, Joseph L. An Experimental Course for Developing Teaching Competence in Secondary School Mathematics. (Stanford University, 1949.)

Smith, James Lester. Foundations in Geometry for High School Teachers. (Oklahoma State University, 1963.) Dis. Abst. 25: 949; Aug. 1964. (c-23, c-30, d-9)

Postulates which form minimal content for a course for teachers were included in proofs of statements and theorems from Ball State and SMSG materials.

d; ---; ---; ---; ---; pre-service; ---; ---.

Steinen, Ramon Frederick. An Exploratory Study of the Results of Providing Increased Feedback to Student Teachers of Mathematics. (The Ohio State University, 1966.) Dis. Abst. 27A: 2929; Mar. 1967. (g-6b)

Feedback helped student teachers to improve, with that from peers and students apparently most helpful.

(I) feedback from self, peer, or students. (D) achievement in teaching skill.

a; ---; 1-only; ---; ---; pre-service; ---; ---.

Stephens, Harold William. An Undergraduate Mathematics Program for Prospective Teachers of Secondary School Mathematics. (Columbia University, 1964.) Dis. Abst. 26: 215-216; July 1965.

A program of mathematical content for teacher preparation was proposed after review of other programs.

d; ---; ---; ---; ---; pre-service; ---; ---.

Stoneking, Lewis William. Factors Contributing to Understanding of Selected Basic Arithmetical Principles and Generalizations. (Indiana University, 1960.) Dis. Abst. 21: 2734-2735; Mar. 1961. (b-4)

Neither age nor teaching experience appeared significantly related to scores on a test of understanding, but teacher background and numbers of high school mathematics courses were related.

r; ---; 1-only; 1,066 students and teachers; 6.4; grs. 8, 12, pre- and in-service; ---; non-norm.

Whelan, James Francis. Correlation of the Professional and Subject Matter Training in the Preparation of Teachers of High School Mathematics. (Ohio State University, 1938.)

Wong, Ruth Eiko Murashige. Status and Direction of Geometry for Teachers. (The University of Michigan, 1968.) Dis. Abst. 29A: 2597-2598; Feb. 1969. (c-23)

A majority of college mathematicians and educators expressed satisfaction with current geometry preparation programs, but also recommended changes. They favored emphasis on transformations, proof and rigor, and methodology. One geometry course was not found to affect attitude toward geometry.

s; ---; 1-only; 130 institutions (2 classes); 1.1, 1.6, 2.6, 3.4, 3.5, 6.4; pre-service; ---; ---.

Pre-service: Preparation procedures (t-1b)

Other References

Brand, 1952	(f-1b)
Carter, 1968	(t-2d)
Earlley, 1954	(t-2b)
Lohela, 1958	(t-1d)
Moser, 1966	(t-1d)
Paradise, 1963	(t-2d)
Steinbrenner, 1955	(b-3)

Hoff, William Eldridge. A Study of Influences on the Choice of Mathematics or Mathematics Education as an Undergraduate Major. (Oklahoma State University, 1962.) Dis. Abst. 24: 141-142; July 1963.

Mathematics education majors agreed most closely in their reasons for choice of a major. Influence of secondary school mathematics subjects and teachers was a factor influencing choice.

s; ---; 2-s; 93 students; 1.9; pre-service; ---; ---.

Pre-service:
Characteristics (t-1d)

Fors, Elton W. Trends and Factors in the Curriculum Choices of the Mathematics Majors in Selected State Colleges and Universities. (The University of Oklahoma, 1969.) Dis. Abst. 30A: 1895; Nov. 1969.

Reasons for mathematics majors selecting the teaching curricula were enjoyment of working with children, high school mathematics teachers, and the number of job opportunities.

s; ---; 1-only; ---; ---; pre-service; ---; ---.

Lohela, Arvo Ephraim. Enrollment Characteristics and Teacher Preparation in Michigan Secondary School Mathematics. (University of Michigan, 1958.) Dis. Abst. 19: 471-472; Sept. 1958. (a-1, t-1b)

Proportional enrollment in mathematics courses decreased between 1925 and 1950, then increased. Some criticisms of the teacher preparation program were cited.

s; ---; ---; ---; 1.6; pre-service; ---; ---.

Moser, James Michael. A Case Study of the Effect of Information Feedback on the Performance of Student Teachers in Mathematics. (University of Colorado, 1965.) Dis. Abst. 26: 5895; Apr. 1966. (d-9, g-6b, t-1b)

A specialized observational technique used with sound tape recordings proved effective in collecting objective data on student teacher performance. Teachers were found to establish a consistent teaching style and to be hesitant to exert overt disciplinary control. Those using SMSG or UICSM texts had the highest amount of spontaneous student participation.

c; ---; 2-s; 5 students; ---; pre-service; 10 wks.; norm, non-norm.

Other Reference

Flora, 1970 (t-1b)

Hesch, Elizabeth Beaman. The Nature of Mathematical Evidence and Its Significance for the Teaching of Secondary School Mathematics. (Columbia University, 1955.) *Dis. Abst.* 16: 507-508; Mar. 1956. (a-2, c-13)

The importance of mathematical evidence and models is discussed; it was suggested that teachers teach for understanding.

d; ---; ---; ---; ---; in-service; ---; ---.

Other References

Harding, 1969	(a-5i)
Kennedy, 1964	(t-1)

In-service: Competency levels (t-2a)

Annis, Richard Hayes. Applicability Ratings of College Mathematics Courses for Secondary School Mathematics Teacher Preparation. (The University of North Dakota, 1965.) Dis. Abst. 26: 5889-5890; Apr. 1966.

Teachers generally agreed that mathematics courses (at the University of North Dakota) were appropriate.

s; ---; 1-only; 90 teachers; 1.9, 6.4; in-service; ---; ---.

Bjork, Clarence Milford. A Survey of State, College, and Municipal Requirements for High School Teachers of Mathematics (Grades Nine to Twelve). (Columbia University, 1950.)

Cook, Cleland Vern. A Study of the Preservice Education of Secondary Mathematics Teachers. (University of South Dakota, 1969.) Dis. Abst. 30A: 3824-3825; Mar. 1970. (t-1a)

Most of the teachers felt adequately prepared to teach mathematics. A sequence of courses was recommended, including courses in statistics and computer science.

s; ---; 2-s; 63 teachers; 2.6; in-service; ---; non-norm.

Haigh, William E. Preparation of Senior High School Mathematics Teachers in South Dakota. (Indiana University, 1970.) Dis. Abst. 31A: 2772; Dec. 1970.

Nine per cent of the teachers had fewer than 12 hours of mathematics courses; weaknesses in geometry, probability and statistics were noted, while strength was indicated in algebra and analysis.

s; ---; 1-only; 274 teachers; 2.6; in-service; ---; ---.

Lyng, Merwin John. Relation of Knowledge of Contemporary Mathematics to Other Variables for a Sample of Experienced Secondary Teachers. (The Ohio State University, 1967.) Dis. Abst. 28A: 989; Sept. 1967. (f-2c)

The four best predictors of a teacher's knowledge of contemporary mathematics were test score, number of mathematics course-hours, age, and number of years of experience in teaching contemporary mathematics.

r; ---; ---; ---; 6.2, 6.3; in-service; ---; non-norm.

Naramore, Vincent H. Cognitive Continuity: A Study of the Secondary School Teachers' Knowledge of the Field Properties of Mathematical Systems. (Syracuse University, 1968.) Dis. Abst. 30A: 191-192; July 1969. (c-2)

Teachers had mastered about 71 per cent of the material deemed basic for knowledge of the field properties. The achievement of subgroups was noted.

s; ---; 2-s; ---; ---; in-service; ---; ---.

Pruitt, Robert. The Mathematics Preparation of Select Secondary School Teachers of Mathematics in Ohio Public Schools, 1961-1962. (The Ohio State University, 1963.) Dis. Abst. 24: 4574; May 1964.

Less than one-third of the seventh and eighth grade teachers had the equivalent of a major in mathematics, and over one-fifth of all secondary teachers had fewer than the minimal number of courses.

s; ---; 2-s; 628 teachers, 585 principals; 1.1, 1.6; in-service;

---; ---.

Recker, Frank William. Status and Trends in Mathematics in Ohio Secondary Schools. (Western Reserve University, 1965.) Dis. Abst. 27A: 333-334; Aug. 1966. (d-9, t-2c)

Teachers (in Ohio) were more familiar with SMSG materials than with those from any of seven other projects. Over 50 per cent of the teachers had attended some form of study session under a grant or stipend. Few teachers had experience with teaching machines or team teaching.

s; ---; ---; 739 teachers; 1.6, 3.15; in-service; ---; non-norm.

Regula, Walter Edwin. Preparation of the Mathematics Teachers in the Public Secondary Schools of West Virginia. (The Ohio State University, 1965.) Dis. Abst. 26: 1432-1433; Sept. 1965.

About one-third of the (West Virginia) teachers had less than 18 hours (considered minimal) of college mathematics.

In-service: Competency levels (t-2a)

s; ---; 1-only; ---; 1.6; in-service; ---; ---.

Sueltz, Ben A. The Status of Teachers of Secondary Mathematics in the United States. (Columbia University, 1934.)

Von Rosenberg, Mary Edna. The Status of Teachers and Teaching of Secondary School Mathematics in Texas for the Academic Year 1942-1943. (University of Texas, 1943.)

Watson, Larry Wayne. The Relationship of the Mathematical Course Work of Teachers and the SAT-M Scores of Their Students. (Duke University, 1969.) *Dis. Abst.* 30A: 2892-2893; Jan. 1970. (ERIC Document No. ED 046 703) (f-2c)

No single course or groupings of courses were significant predictors of student achievement, but the number of semester hours of mathematics taken by a teacher and the number of students in grade 12 of his school were significant predictors.

r; ---; 2-r; 900 students, 138 teachers (28 schools); 6.2; grs. 9-12, in-service; ---; ---.

Other References

Alspaugh, 1966	(t-2d)
Bradshaw, 1968	(t-2d)
Martin, 1967	(t-1a)
Massie, 1968	(t-1a)
Nemecek, 1956	(t-2d)

Atkins, Robert Adville. A Follow-Up Study of Graduates of the General Electric Mathematic Fellowship Program. (New York University, 1960.) Dis. Abst. 21: 3001; Apr. 1961.

The fellowship program was thought by teachers to aid them in teaching and in prestige.

s; ---; 1-only; 553 teachers; 1.6; in-service; ---; ---.

Bompart, Billy Earl. The Development of an Undergraduate Program for Prospective Secondary School Mathematics Teachers Based on an Analysis of State Certification Requirements. (The University of Texas, 1967.) Dis. Abst. 28A: 4020; Apr. 1968.

A program was designed which meets the standards of four of seven national and regional organizations and the certification requirements of 41 states, and provides background for all courses except computer mathematics.

d; ---; ---; ---; ---; in-service; ---; ---.

Bradberry, Helon Styles. A Study of the Participants in the 1959-60 and 1960-61 Academic Year Institutes Sponsored by the National Science Foundation at Six Southeastern Universities. (University of Georgia, 1967.) Dis. Abst. 28A: 2114; Dec. 1967.

Teachers felt that the institutes had resulted in significant changes in their teaching methods, and aided them professionally.

s; ---; 1-only; 348 teachers, 230 principals; 1.6; in-service;

---; ---.

Brockman, Harold William. A Critical Study of the Use of the Terms "Necessary Conditions" in the Teaching of Mathematics. (The Ohio State University, 1962.) Dis. Abst. 24: 193-194; July 1963. (c-13, c-25)

Surveys of teachers and textbooks indicated little attention had been given to "necessary" and "sufficient" conditions; specific definitions and methods of teaching them were proposed.

s; ---; 1-only; 187 teachers; ---; pre- and in-service; ---; ---.

In-service procedures (t-2b)

Byrkit, Donald Raymond. A Comparative Study Concerning the Relative Effectiveness of Televised and Aural Materials in the Inservice Training of Junior High School Mathematics Teachers. (The Florida State University, 1968.) Dis. Abst. 29A: 1463; Nov. 1968. (ERIC Document No. ED 028 071) (d-4)

No significant differences between groups studying concepts of integers by videotape or by only the soundtrack from the videotape were found, but the videotape group did better on pedagogical questions related to the lesson on elementary number theory.

(I) videotape or audiotape lessons. (D) achievement; retention; attitude.

e; 3.15 r; 2-s, 3-r; 54 teachers; ---; in-service in jr. high;

1 day (retention, 8 days); non-norm.

Clark, John Ferguson. A Study of the Relative Effectiveness of Some In-Service Programs in Modern Mathematics on Second and Seventh Grade Teachers in Nine Northeastern California Counties. (University of California, Berkeley, 1967.) Dis. Abst. 28A: 2578-2579; Jan. 1968.

In-service programs were indicated as being of great help in learning the content of modern mathematics.

s; ---; 2-s; 335 teachers, 4,800 students; 1.6, 3.4; grs. 2, 7, in-

service; ---; ---.

Connellan, Miriam Elizabeth. The Content of Secondary School Mathematics Courses Taught in Colorado by Teachers Who Attended the 1957-58 and the 1958-59 Colorado Academic Year Institutes. (University of Colorado, 1962.) Dis. Abst. 23: 541; Aug. 1962. (b-3)

Teachers reported that they used more enrichment topics, placed less dependence on the textbook, and were more professionally aware after being in the AYI program.

s; ---; ---; ---; ---; in-service; ---; ---.

Cooney, Thomas James. An Analysis of Teachers' Verbal Behavior Using the Theory of Relations. (University of Illinois, 1969.) Dis. Abst. 31A: 673; Aug. 1970. (c-2, c-13, g-4)

Transcripts from 44 classroom sessions were analyzed to develop a description of ways that mathematics teachers assist students in organizing their cognitive knowledge through deduction, induction, classifying, and analyzing.

s; ---; 1-only; 10 teachers; ---; in-service in grs. 7-12; ---;

---.

Earlley, Harry Wayne. Academic and Professional Preparation of Secondary School Teachers of Mathematics. PSU 17: 275-278; 1954. (t-1b)

Courses which were deemed important to success in teaching secondary school mathematics were determined, as well as the level of preparation attained by teachers.

s; ---; 1-only; 370 sec. and college teachers; 1.6; in-service;

---; ---.

Heideman, Robert G. National Science Foundation Academic Year Institutes for Secondary School Teachers of Science and Mathematics Held at The University of Wisconsin 1956-57 Through 1958-59. "An Evaluation of the Background, Training, Placement, and Occupational Mobility of the Participants." (The University of Wisconsin, 1962.) Dis. Abst. 23: 2025; Dec. 1962.

Teachers reacted favorably to AYI in that they obtained a higher degree, upgraded subject matter backgrounds, learned new teaching and research techniques, and improved methodology.

s; ---; 2-s; 147 teachers; ---; in-service; ---; non-norm.

In-service procedures (t-2b)

Irby, Bobby Newell. A Follow-Up Study of the Participants of the National Science Foundation Academic Year Institutes for High School Teachers of Science and Mathematics Held at the University of Mississippi, 1961-66. (The University of Mississippi, 1967.) Dis. Abst. 28A: 2120; Dec. 1967.

The AYI program was considered suitable for upgrading competency and useful in teaching. However, only the best prepared teachers were selected; those with poor academic records were systematically excluded.

s; ---; 2-s; 151 teachers; ---; in-service; ---; ---.

Kelley, Roscoe Douglas. An Analysis of Two Mathematics Workshops for Teachers and Outcomes as Reflected in Participating Schools. (Alabama Polytechnic Institute, 1958.) Dis. Abst. 19: 1305-1306; Dec. 1958.

Specific ways in which two workshops had affected teacher behavior were cited.

s; ---; 1-only; 25 teachers (21 schools); ---; in-service in grs.

7-12; ---; ---.

Martinen, Gordon David. A Study of the National Science Foundation Summer Institutes in Science and Mathematics Held at the University of Idaho from 1957 Through 1964 and Their Impact on Professional Activities of the Recipients. (University of Idaho, 1967.) Dis. Abst. 28A: 2446-2447; Jan. 1968. (ERIC Document No. ED 022 702)

Institute training produced few changes in recipients' educational and professional stature, though those with more training produced more changes.

s; ---; 2-s; 206 teachers; 2.6, 3.2; in-service; ---; ---.

McDermott, Cecil Wade. Industrial Applications of Mathematical Models and Abstract Mathematical Systems for Use in Selected Graduate Mathematics Education Courses. (Auburn University, 1967.) Dis. Abst. 28A: 1331; Oct. 1967. (a-2)

Three supplementary units involving mathematical models using a physical situation were designed.

d; ---; ---; ---; ---; ---; ---; ---.

Schlessinger, Frederick Richard. A Study and Evaluation of Sponsored Programs for High School Science and Mathematics Teachers During the Summer of 1956. (The Ohio State University, 1957.) Dis. Abst. 18: 2073-2074; June 1958. (b-3, t-2d)

Background and experience of teachers who had participated in summer study programs was ascertained.

s; ---; 2-s; 934 teachers; 1.6; in-service in grs. 9-12; ---; ---.

Selser, Will Lindsey. An Evaluation of an In-Service Institute for Improving Science and Mathematics Instruction in the Hillsborough County Junior High Schools. (The University of Florida, 1962.) Dis. Abst. 23: 3804-3805; Apr. 1963.

Mathematics teachers who had participated in an in-service institute and their students scored higher on achievement tests than did teachers who had not participated and their students.

f; ---; 2-s; 78 teachers, 1,506 students; 1.5, 3.4; grs. 7-9,

in-service; ---; norm.

Small, Dwain E. Opinions of Secondary Mathematics Teachers Concerning the Fifth Year of Teacher Education. (Indiana University, 1955.) Dis. Abst. 15: 2120-2121; Nov. 1955.

Recommendations by teachers were specifically cited.

s; ---; 2-r; 951 teachers; ---; in-service; ---; ---.

Smith, Sandra Noel. The Effectiveness of Supervisory Techniques Used with Beginning Mathematics Teachers in the Public Secondary Schools. (The Catholic University of America, 1967.) Dis. Abst. 28A: 3444; Mar. 1968.

Some techniques considered extremely valuable were not frequently used by supervisors. There were more similarities than variances.

s; ---; 1-only; ---; 1.6; in-service; ---; ---.

In-service procedures (t-2b)

Swadener, Marc. National Science Foundation Summer Institute in Mathematics at Indiana University, 1957 Through 1969. (Indiana University, 1970.) Dis. Abst. 31A: 2779; Dec. 1970.

Pre-1963 participants had a higher regard for lectures and discussion leaders and were more involved than previously in leadership activities than were later participants. Participants were less mobile within and across schools than mathematics teachers in general. Fewer than one-fifth completed four sessions.

f; ---; 2-s; ---; 1.1, 1.4, 2.6, 3.4; in-service; ---; non-norm.

Todd, Robert Marion. A Course in Mathematics for In-Service Teachers: Its Effect on Teachers' Understandings and Attitudes. (University of Virginia, 1965.) Dis. Abst. 26: 5898-5899; Apr. 1966. (a-6, d-5)

Results indicated significant improvement in understanding of arithmetic and attitudes toward arithmetic for those completing the course. Duration of the course or use of a programmed text did not significantly affect the gains in understanding or attitudes.

a; ---; 1-only; 287 teachers; 1.4; in-service in grs. K-12; ---;

non-norm.

Vanaman, Sherman Benton. Toward a Theory of Teaching with Special Reference to the Acquisition of Behaviors of a Mathematical Nature. (University of Maryland, 1967.) Dis. Abst. 28A: 3577; Mar. 1968.

A teaching model and a collection of axioms, from which were deduced a set of theorems and colloraries, resulted from a review of literature and other investigations. Suggestions for testing the theory and examples of experimental designs to test specific parts of the theory are presented.

d; ---; ---; ---; ---; in-service in grs. K-12; ---; ---.

Wade, Harmon V. A Case Study of the Role of a Superintendent of Schools in District-Wide Curriculum Development in Modern Mathematics and Science Education and an Evaluation of Resulting Educational Outcomes. (New York University, 1968.) Dis. Abst. 30A: 119-120; July 1969.

A coordinated program was developed and implemented; students maintained or increased in academic proficiency.

c; ---; ---; 1 supt.; ---; supt. (grs. K-12); ---; ---.

Wetter, Donald Merlin. An Analysis of the Preparation of Secondary School Teachers of Mathematics with Special Reference to the New Mathematics Programs. (The University of Nebraska Teachers College, 1966.) Dis. Abst. 27A: 1289; Nov. 1966.

Teachers have recognized the need to take courses to acquire background for teaching "modern mathematics".

s; ---; 2-s; ---; ---; in-service; ---; ---.

Whitaker, Mack L. A Study of Participants in Summer Mathematics Institutes Sponsored by the National Science Foundation. (The Florida State University, 1961.) Dis. Abst. 22: 2712; Feb. 1962. (d-9)

Teachers indicated they had introduced new topics, such as set theory, to their classes. About half were using experimental-type textbooks, with more than half of this group using SMSG materials.

s; ---; 1-only; 326 teachers; ---; in-service; ---; ---.

Wiersma, William, Jr. A Study of National Science Foundation Institutes: Mathematics Teacher's Reactions to Institute Programs and Effects of These Programs on High School Mathematics Courses. (The University of Wisconsin, 1962.) Dis. Abst. 23: 1239-1240; Oct. 1962.

Participants felt the institutes were helpful. New ideas were used in their classrooms, but few new courses had been set up.

s; ---; 2-s; ---; ---; in-service; ---; ---.

Wilson, Howard LeRoy. A Follow-Up on the Participants of the Mathematics Academic Year Institutes Held at the University of Illinois. (University of Illinois, 1966.) Dis. Abst. 27A: 2092-2093; Jan. 1967. (t-2d)

A significant proportion of the AYI participants did not return to pre-AYI teaching positions. Many taught more advanced courses, went to college positions, or returned to graduate school.

s; ---; ---; 237 teachers; ---; in-service; ---; ---.

In-service procedures (t-2b)

Wood, Nolan Earl, Jr. The Effect of an In-Service Training Program in Verbal Interaction Analysis on Teacher Behavior in the Classroom. (University of Houston, 1968.) *Dis. Abst.* 29A: 3788-3789; May 1969. (t-2c, t-2d)

The group having in-service instruction in interaction analysis became significantly more direct in their verbal behavior in the classroom, but did not significantly change attitudes.

(I) in-service program. (D) behaviors.

e; 3.4; 2-s, 3-s; 40 teachers; 3.2; in-service; 14 wks.; ---.

Woods, Dale. Topical Content for Certain Fifth-Year Mathematics Courses for Missouri Secondary School Mathematics Teachers. (Oklahoma State University, 1961.) *Dis. Abst.* 23: 549-550; Aug. 1962. (b-3)

Criteria dealing with contributions a content topic should make in teacher-preparation programs were determined and certain topics were recommended.

d; ---; ---; ---; ---; in-service; ---; ---.

Yon, John F. The Academic Year Institute for High School Teachers of Science and Mathematics at The Pennsylvania State University During the 1957-58 Term. (The Pennsylvania State University, 1959.) *Dis. Abst.* 20: 3216; Feb. 1960. (t-2d)

The institutes were considered valuable and professionally advantageous by participants.

s; ---; 2-s; ---; ---; in-service; ---; ---.

Other References

Barbeau, 1969	(t-1b)	Rosenberg, 1955	(c-24)
Hanna, 1966	(b-3)	Smith, E. P., 1970	(t-2d)
Jorgensen, 1967	(t-2d)	Weise, 1967	(a-6)
Mahaffey, 1969	(f-4)		

Haynes, Robert Clayton. The Role of In-Service Education in Attitudinal Change for Teachers of Slow Learners in Mathematics and Science. (George Peabody College for Teachers, 1969.) Dis. Abst. 30A: 4307; Apr. 1970. (e-2b)

Attitudes of teachers who took an in-service course on teaching slow learners were changed significantly more than for local or distant control groups.

(I) in-service course or no course; marital status; age; experience.
(D) attitude scores.

e; 3.21; 1-only; 102 teachers; 2.6, 3.2, 5.2; in-service in grs. 7-9; ---; norm.

Hodgin, Katharine Wyatt. A Study of Aspects of Curriculum Change in Mathematics as Perceived by Selected Mathematics Teachers in Alabama Secondary Schools. (University of Alabama, 1966.) Dis. Abst. 27A: 2733; Mar. 1967. (b-3)

The most frequently mentioned sources of impetus for change were personal feelings and abilities of teachers. Teachers appeared weak in diagnosis, formulating objectives, and evaluation; they relied on textbooks for selecting and organizing content and learning experiences.

s; ---; 2-s; 50 teachers; 1.6; in-service in grs. 9-12; ---; non-norm.

Howard, Homer. Mathematics Teachers' Views Concerning Certain Issues in the Teaching of Mathematics. (Teachers College, Columbia University, 1940.)

Nugent, Paul Thomas. A Study of Selected Elementary Teachers' Attitudes Toward the New Mathematics. (University of Kentucky, 1967.) Dis. Abst. 30A: 2265; Dec. 1969.

Attitudes were favorable, with women, younger students, and those with least experience found to be most favorable.

f; ---; 1-only; 670 teachers; 2.6, 3.2, 3.3; in-service in grs. K-9; ---; non-norm.

In-service: Attitudes (t-2c)

Spillane, Daniel Paul. The Attitudes of Pennsylvania Secondary Mathematics Teachers Toward the Inclusion of Analytic Geometry, Calculus, and Statistics in the High School Program. (University of Pittsburgh, 1959.) Dis. Abst. 20: 1646; Nov. 1959. (c-23, c-26)

Teachers felt analytic geometry, calculus, and statistics could and should be included in the curriculum.

s; ---; 2-r; 380 teachers; ---; in-service in grs. 9-12; ---; ---.

Other References

Donovan, 1956	(t-1b)
Howe, 1967	(t-1b)
Recker, 1966	(t-2a)
Wood, 1969	(t-2b)

Alspaugh, John William. A Survey of Secondary Mathematics Programs in Missouri with Emphasis on Content, Procedures, and Preparation of Teachers. (University of Missouri, 1965.) Dis. Abst. 26: 5259-5260; Mar. 1966. (b-4, t-2a)

A large majority of the (Missouri) teachers used a "tell and do" method, daily assignments, and supervised study. About half of the algebra courses taught were classified as "modern", but most other courses were "traditional".

s; ---; 2-r; 50 teachers; 1.6; in-service in grs. 9-12; ---; ---.

Barnes, Ward Ewing. A Study of the Variables That Influence Secondary Public School Mathematics Teachers in Pennsylvania to Remain in or Leave the Teaching Profession During 1968-69. (University of Pittsburgh, 1969.) Dis. Abst. 31A: 50-51; July 1970.

Predictable economic, personal, and professional reasons for each sex leaving or remaining in teaching were found. Certain aspects of a teacher's personality and professional attitude were found to distinguish one likely to leave teaching.

s; ---; ---; 568 teachers (50 districts); ---; in-service in grs.

7-12; ---; non-norm.

Bradshaw, Charles Kenneth. Mathematics Teaching in the Public Secondary Schools of the State of Nevada. (University of California, Berkeley, 1968.) Dis. Abst. 29A: 1148; Oct. 1968. (t-2a)

Half of the teachers were found to be unqualified as mathematics teachers. A majority read professional journals, but only one-fifth were members of NCTM.

s; ---; ---; 321 teachers; ---; in-service; ---; ---.

Brunsvold, Perley Olandus. The Relationship Between Selected School District Variables and Teacher Assignment Based on Preparation. (The University of Iowa, 1966.) Dis. Abst. 27A: 341-342; Aug. 1966.

Teachers with undergraduate majors in mathematics and English were most apt to be assigned to teach their major full-time.

s; ---; ---; 8,749 teachers; 2.2, 2.6; in-service; ---; ---.

In-service:
Characteristics (t-2d)

Carter, Jack Caldwell. Selected Characteristics of Beginning Science and Mathematics Teachers in Georgia. (University of Georgia, 1967.) Dis. Abst. 28A: 4929; June 1968. (t-1b)

Differences between male and female teachers were found. Teachers of mathematics were more satisfied with preparation courses than were science teachers.

s; ---; 2-r; 157 teachers; 2.6, 3.2, 6.4; in-service; ---; norm,

non-norm.

Daugherty, J. Dwight. The Function of the Mathematics Department Head in a Large Urban High School. (New York University, 1954.) Dis. Abst. 14: 785-786; May 1954.

Significant tasks of department heads are cited.

s; ---; 2-s; 313 schools; 1.6; in-service in grs. 9-12; ---; ---.

Fey, James Taylor. Patterns of Verbal Communication in Mathematics Classes. (Columbia University, 1968.) Dis. Abst. 29A: 3040; Mar. 1969. (a-6, d-9, f-1a)

Analysis of tape-recorded lessons was used to develop a profile of verbal activity in the observed classes, with patterns described through use of an instrument identifying interaction components. Teachers were found to speak more than students, with specific types of statements noted.

s; ---; 1-only; ---; 1.6, 1.7; in-service; ---; ---.

Fields, Ewaugh Finney. A Study of Changes in the College Preparatory Mathematics Curriculum and Institute Attendance of Mathematics Teachers in Public Secondary Schools of New Jersey During 1964-1967. (Temple University, 1969.) Dis. Abst. 31A: 1114-1115; Sept. 1970.

About two-thirds of the teachers had attended NSF institutes. While vectors and calculus had been added to some curricula, the correlation between changes and institute attendance was only .28.

s; ---; 1-only; 833 teachers, 152 dept. chairmen; ---; in-service;

---; non-norm.

Gallagher, Robert Patrick. Personality Characteristics of Counseling and Mathematics Institute Trainees, Changes That Occur During Training, and Relationships Between Counselor Characteristics and Counseling Potential. (Rutgers - The State University, 1968.) Dis. Abst. 28A: 4908; June 1968. (e-5)

The Mathematics Training group scored lower than Counselor Training on many social-emotional factors, but were more aggressive, competitive, and persistent.

s; ---; 2-s; 62 teachers; 3.3, 3.4, 5.3; in-service; 1 yr.; norm,

non-norm.

Hernandez, Norma Eugenia Gonzalez. An Observation System to Analyze Cognitive Content of Teacher Discourse in a Mathematics Lesson. (The University of Texas at Austin, 1970.) Dis. Abst. 31A: 1664; Oct. 1970. (a-6)

Great variability among teachers was noted. The predominant cognitive process used was memory; there was little convergent and almost no divergent discourse. Classification, Narration, and Evaluation were coded most frequently.

r; ---; 1-only; 4 teachers; 3.2, 6.4; in-service in gr. 8; ---;

non-norm.

Hill, John Clarence. The Analysis of Content Development Through Classroom Communication. (The Ohio State University, 1969.) Dis. Abst. 30A: 4330; Apr. 1970. (a-6)

Almost no interpretable patterns of content development could be ascertained from observation data on classroom communication.

s; ---; 1-only; 12 classes (3 math); ---; in-service in jr. high;

---; non-norm.

In-service:
Characteristics (t-2d)

Hoeh, James Albert, Jr. The Effectiveness of Department Chairmen in the Improvement of Instruction. (The University of Michigan, 1969.) Dis. Abst. 30A: 3682-3683; Mar. 1970.

A marked correlation was found between amount of time a chairman assigns to supervision and teachers' perception of his effectiveness. Classroom visitation was the least used supervisory technique, and also the one teachers least desire.

s; ---; ---; 79 chairman, 585 teachers (20 schools); 3.3; in-service;

---; non-norm.

Jackson, Tillman Valentine. The Scope and Nature of Quasi-Supervision in the State of Oklahoma with Focus Upon the Status and Role of Quasi-Supervisors of Secondary Science and Mathematics. (The University of Oklahoma, 1965.) Dis. Abst. 26: 3720; Jan. 1966.

It was found that teachers were engaged in part-time supervisory activities, but their roles were not well-defined or recognized.

s; ---; ---; ---; ---; in-service; ---; ---.

Jorgensen, Harold Christen. Characteristics of Teachers Submitting Applications for Academic Year Institute Programs at Oregon State University. (Oregon State University, 1966.) Dis. Abst. 27A: 2425; Feb. 1967. (t-2b)

Differences between teachers accepted and rejected for an institute were determined.

s; ---; 2-s, r; ---; 2.6, 3.2; in-service; ---; ---.

Kneitz, Margaret H. A Study of Secondary Mathematics Teacher Dropouts in Texas. (University of Houston, 1969.) Dis. Abst. 30A: 2402; Dec. 1969.

Reasons for leaving the profession differed as functions of psychological and economic factors. Perceptions of reality were significantly different among groups of teachers and dropouts.

s; ---; 2-s; ---; ---; pre- and in-service; ---; ---.

Kysilka, Marcella Louise. The Verbal Teaching Behaviors of Mathematics and Social Studies Teachers in Eighth and Eleventh Grades. (The University of Texas at Austin, 1969.) Dis. Abst. 30A: 2725; Jan. 1970. (a-6)

Mathematics teachers asked more convergent and procedural-positive questions, made more directing and describing statements, rejected few student responses, and talked more than social studies teachers. Students volunteered less frequently in mathematics.

s; ---; 1-only; 24 teachers; 1.6, 1.7, 3.2; in-service in grs. 8, 11; 4 observations; ---.

Nelson, Theodora Sophia. Factors Present in Effective Teaching of Secondary School Mathematics. (The University of Nebraska Teachers College, 1959.) Dis. Abst. 20: 3207-3208; Feb. 1960.

Varied methods were used by teachers, but class organization manifested relatively few accommodations to individual differences. Most students liked mathematics and found it interesting and stimulating.

s; ---; ---; 100 teachers, 2,185 students; ---; in-service; ---; ---.

Nemecek, Vivian. Preparation, Problems, and Practices of Mathematics Teachers in the North Central High Schools of Oklahoma. (The University of Oklahoma, 1955.) Dis. Abst. 16: 73; Jan. 1956. (t-2a)

Teachers were found to be well-prepared in terms of degrees and course work. One out of six reported no courses in the teaching of mathematics.

s; ---; 2-s; 195 teachers; 1.6; in-service; ---; ---.

Paradise, Michael Emmanuel. A Follow-Up Study of the Colorado State College Mathematics Graduates, 1950-1959. (Colorado State College, 1962.) Dis. Abst. 23: 4247-4248; May 1963. (t-1b)

The mathematics curriculum was found to be adequate for teachers, except in the areas of applied mathematics and methods courses.

s; ---; 1-only; ---; 1.6; in-service; ---; ---.

In-service:
Characteristics (t-2d)

Robitaille, David Ford. Selected Behaviors and Attributes of Effective Mathematics Teachers. (The Ohio State University, 1969.) Dis. Abst. 30A: 1472-1473; Oct. 1969.

The effective mathematics teacher seeks to increase the level of student participation in the lesson significantly more often than does the less effective mathematics teacher.

s; ---; 2-s; ---; 3.4, 3.12; in-service; ---; non-norm.

Roye, James Paul. Modifications of Professional Characteristics of Teacher Participants in National Science Foundation Sponsored Academic Year Institutes. (Arizona State University, 1968.) Dis. Abst. 29A: 503; Aug. 1968.

Attending an AYI appeared to encourage teachers to teach more effectively.

s; ---; 1-only; ---; 1.1, 1.6; in-service; ---; ---.

Schaefer, Sister Mary Geralda. A Critical Analysis of the Mathematics Programs in Selected Catholic Secondary Schools in the United States. (The University of Texas, 1967.) Dis. Abst. 27A: 4174; June 1967. (b-3)

Teachers all had the bachelor's degree, but did not meet other recommended background levels.

d; ---; 1-only; 40 teachers; 1.6; in-service; ---; ---.

Seeburger, George Harold. A Comparison of Baccalaureate Science and Mathematics Education Graduates (1953-1963) Active and Inactive in Mathematics and Science Education in 1964. (University of Georgia, 1964.) Dis. Abst. 25: 5771; Apr. 1965.

Of those graduating between 1953 and 1963, 57 per cent were active in mathematics or science education in 1964. Those still active had earned higher grades in college, but earned less money in 1964.

s; ---; 1-only; 412 teachers; 1.6; in-service; ---; ---.

Smith, Earl Pearson. An Investigation Into the Relationship Between Selected Personal and Professional Characteristics of Teachers and Their Preferences for Behavioral Objectives. (Syracuse University, 1970.) Dis. Abst. 31A: 2798; Dec. 1970. (a-5i, t-2b)

No relationship was found between personality types and preference for behavioral objectives. Teachers of mathematics and science did not differ significantly from other teachers in their preference, though they had more "sensate" and "judger" types of personality.

s; ---; 1-only; 85 teachers; ---; in-service; ---; ---.

Smith, Shelby Dean. A Survey of Mathematics Teachers in Illinois, 1963-64. (University of Illinois, 1966.) Dis. Abst. 27A: 2091; Jan. 1967. (b-3)

Characteristics of teaching situations were cited. About half the teachers were well-prepared, though less than half used programs they considered "modern".

s; ---; 2-s; ---; 1.6, 2.6; in-service; ---; ---.

Stallings, Charles David. Multiple Discriminant Analyses of Teacher Behavior and Pupil Perceptions of Contrasting Groups of Beginning Teachers. (University of Georgia, 1968.) Dis. Abst. 29A: 2594; Feb. 1969.

Observers categorized good and poor mathematics teachers almost as they were categorized on the basis of 25 variables.

s; ---; 2-r; 470 teachers; 1.6, 2.6, 6.2; in-service; ---; ---.

Stilwell, Merle Eugene. The Development and Analysis of a Category System for Systematic Observation of Teacher-Pupil Interaction During Geometry Problem-Solving Activity. (Cornell University, 1967.) Dis. Abst. 28A: 3083; Feb. 1968. (a-6, c-23)

Teacher talk was found to consume approximately three times as much time as student talk; less than three per cent of all time in problem solving involved method of solving a problem; approximately eight per cent of all time was coded as student silence.

s; ---; 1-only; 12 teachers; ---; in-service; 6 classes; non-norm.

In-service:
Characteristics (t-2d)

Tomedy, Francis Joseph. The Relationship of Personality Characteristics to Measured Interests of Women Teachers of English, Social Science, Mathematics, and Physical Science in Certain Senior High Schools. (New York University, 1952.) Dis. Abst. 12: 540-541; Issue No. 4, 1952.

Teachers of mathematics and science were found to be more controlled, quiet, reserved, and theoretical than other groups of teachers. Social passiveness, self-mystery, and low sympathy were traits also correlated with these teachers.

r; ---; 2-s; 60 math and science teachers; 2.6, 3.15, 6.3;

in-service; ---; norm, non-norm.

Valsame, James. A Study of Selected Aspects of Mathematics Teacher Training in North Carolina as Related to Recent Trends in Mathematics Teaching. (The University of North Carolina, 1961.) Dis. Abst. 23: 549; Aug. 1962.

The teachers were not well qualified when compared with recommendations for background, but compared favorably with teachers in other studies.

s; ---; 2-s; ---; ---; in-service; ---; ---.

Van Woert, Robert Allan. The Qualifications and Assignments of Teachers of English, Mathematics and Science in the High Schools of Idaho, 1966-67. (University of Idaho, 1969.) Dis. Abst. 31A: 670; Aug. 1970.

Mathematics teachers in Idaho were found to be not well-trained when compared with standards set by professional groups. They taught more classes than is recommended.

s; ---; 2-r; ---; 3.3, 3.4; in-service; ---; ---.

Wolfe, Richard Edgar. Strategies of Justification Used in the Classroom by Teachers of Secondary School Mathematics. (University of Illinois, 1969.) Dis. Abst. 30A: 1064-1065; Sept. 1969. (a-4, c-21, c-22, c-23)

Types of strategies used in algebra, general mathematics, and geometry classes were analyzed.

s; ---; 1-only; 11 teachers; 1.6; in-service; ---; ---.

Other References

Cawelti, 1963	(e-4)
Ferguson, 1957	(f-1a)
Flora, 1970	(t-1b)
Schlessinger, 1958	(t-2b)
Schuler, 1963	(a-1)
Smith, W. R., 1965	(f-4)
Wilson, 1967	(t-2b)
Wood, 1969	(t-2b)
Yon, 1960	(t-2b)

IV. Summary Data and Conclusion

Many tables could be developed to synthesize the information in this final report. However, the intention of this chapter is not to ascertain how much data can be collected, but to present only certain data which seem meaningful in terms of the original purpose of the project. Thus, data which summarize what, how, where, and when for the mathematics educator are included.

In all, 780 research reports and 770 dissertations were located. This does not represent the true number of reports and dissertations published between 1930 and 1970: some were undoubtedly missed despite careful searching. This Final Report does represent, however, the largest documented collection of research on secondary school mathematics.

Table I indicates the sources of the research reports which were found. Fifty-nine journals, plus ERIC documents, are listed. It is interesting to note that 300 of the 780 reports were published in only three journals: The Mathematics Teacher (129), School Science and Mathematics (108), and Journal of Educational Research (63). This represents 38 per cent of the total. ERIC documents which were not published elsewhere account for another 100. Five other journals published 178 more: The Arithmetic Teacher (40), Elementary School Journal (37), School Review (36), Journal of Educational Psychology (33) and Journal of Experimental Education (32). Thus, nine sources account for 74 per cent of the reports; 51 journals account for the remaining 26 per cent.

TABLE I

FREQUENCY OF REPORTS BY JOURNAL SOURCE

American Education	1
American Educational Research Journal	5
American Journal of Mental Deficiency	8
American Mathematical Monthly	8
Arithmetic Teacher	40
AV Communication Review	3
Audiovisual Instruction	1
California Journal of Educational Research	10
Catholic Education Review	1
Chicago Schools Journal	2
Child Development	7
Clearing House	1
Contemporary Education	1
Education of the Visually Handicapped	1
Educational Administration and Supervision	7
Educational Method	4
Educational Outlook	1
Educational and Psychological Measurement	12
Educational Research Bulletin	4
Elementary School Journal	37
ERIC Documents	100
Exceptional Children	2
Graduate Research in Education and Related Disciplines	4
Harvard Educational Review	2
High Points	18
Indiana University School of Education Bulletin	4
Journal of Applied Psychology	9
Journal of Clinical Psychology	1
Journal of Educational Measurement	10
Journal of Educational Psychology	33
Journal of Educational Research	63
Journal of Experimental Child Psychology	1
Journal of Experimental Education	32
Journal of Experimental Psychology	2
Journal of Genetic Psychology	19
Journal for Research in Mathematics Education	3
Journal of Research Services	1
Journal of School Psychology	1
Journal of Social Psychology	2
Journal of Speech Disorders	1
Journal of Teacher Education	2
Mathematics Teacher	129
Peabody Journal of Education	6
Perceptual Motor Skills	1
Personnel and Guidance Journal	2
Pittsburgh Schools	2
Psychological Reports	12
Psychology in the Schools	5
School Board Journal	1
School and Community	1
School Executive	2
School Review	36
School Science and Mathematics	108
School and Society	5
Science Education	1
Supplementary Educational Monographs	1
Teachers College Record	1
Texas Outlook	1
Training School Bulletin	1
Wisconsin Journal of Education	1

Table II indicates the number of reports which were published each year. The increase in the decade of the Sixties is evident:

1930 - 1939	191
1940 - 1949	111
1950 - 1959	102
1960 - 1969	330
1970 -	46

This figure (330) includes ERIC documents: the information system is providing a strong supplement to other publishing sources.

Table III indicates the number of dissertations reported each year. Where the abstract source is known, this date was used; otherwise, the date of the completion of the dissertation was used. Here the increase in the decade of the Sixties is dramatic:

1930 - 1939	46
1940 - 1949	45
1950 - 1959	122
1960 - 1969	469
1970 -	88

It must be pointed out that there was no one major source of information about dissertations prior to 1938, when Microfilm Abstracts, the forerunner of Dissertation Abstracts, first appeared. Dissertations from a restricted set of universities were included at first.

TABLE II

FREQUENCY OF REPORTS BY YEAR

1930	19	1950	6
1931	14	1951	7
1932	35	1952	8
1933	16	1953	10
1934	19	1954	11
1935	23	1955	10
1936	19	1956	14
1937	23	1957	13
1938	10	1958	11
1939	13	1959	12
1940	8	1960	20
1941	18	1961	21
1942	6	1962	24
1943	14	1963	29
1944	12	1964	31
1945	7	1965	26
1946	10	1966	39
1947	9	1967	45
1948	7	1968	39
1949	20	1969	56
		1970	46
		Total	780

TABLE III

FREQUENCY OF DISSERTATIONS BY YEAR

1930	3	1950	11
1931	6	1951	7
1932	8	1952	14
1933	6	1953	1
1934	4	1954	7
1935	4	1955	16
1936	1	1956	13
1937	4	1957	16
1938	7	1958	19
1939	3	1959	18
1940	12	1960	22
1941	1	1961	20
1942	6	1962	33
1943	4	1963	27
1944	4	1964	33
1945	0	1965	44
1946	2	1966	71
1947	6	1967	61
1948	4	1968	68
1949	6	1969	90
		1970	88
		Total	770

Table IV presents data on the number of reports which were categorized in each mathematical topic. The totals by the broad categories present a clearer summary of the relative emphasis of the research, especially when cross references are considered:

	Primary	Cross	Total
Planning for Instruction	148	114	262
Content: Sequencing and Structuring	39	30	69
Content: Methods of Instruction	65	307	372
Materials	119	126	245
Individual Differences	150	120	270
Evaluating Progress	146	129	275
Learning Theory	64	49	113
Teacher Education	49	35	84
	780		

Table IV also indicates the number of studies which were categorized under each type of research:

descriptive	47
survey	224
case study	5
action	130
correlational	119
ex post facto	87
experimental	168

TABLE IV

FREQUENCY OF REPORTS BY MATHEMATICAL TOPIC AND TYPE OF STUDY

Type of Study	d	s	c	a	r	f	e	Total	Cross References	Sum*
Historical developments (a-1)	3	1						4	7	11
Nature, values, and uses of mathematics (a-2)		2						2	6	8
Organizational patterns (a-3)				4		2	3	9	5	14
Teaching approaches (a-4)		3		11		7	28	49	30	79
Drill and practice (a-5a)				1				1	8	9
Problem solving (a-5b)		5		1	5	3	9	23	15	38
Estimation (a-5c)							1	1	0	1
Mental computation (a-5d)						1	1	2	1	3
Homework and supervised study (a-5e)				5	1		5	11	2	13
Review (a-5f)								0	0	0
Checking (a-5g)								0	0	0
Writing and reading numerals (a-5h)		2						2	0	2
Specification of objectives (a-5i)							1	1	5	6
Attitude, self-concept, and climate (a-6)		20		1	3	2	2	28	29	57
International comparisons (a-7)	9	2		1		3		15	6	21
Subtotal	12	35	0	24	9	18	50	148	114	262

TABLE IV (continued, p. 2)

Type of Study	d	s	c	a	r	f	e	Total	Cross References	Sum*
Pre-first grade concepts (b-1)								0	1	1
Readiness (b-2)								0	1	1
Content organization and inclusion (b-3)	3	13		3		2		21	17	38
Quantitative understanding (b-4)		5			1			6	1	7
Grade placement (b-5)	1	4				2		7	7	14
Time allotment (b-6)				1		1	3	5	3	8
Subtotal	4	22	0	4	1	5	3	39	30	69
Counting (c-1)								0	0	0
Number properties and relations (c-2)		2	1				1	4	3	7
Whole numbers (c-3)		1						1	10	11
Addition (c-3a)								0	2	2
Subtraction (c-3b)		1				1		2	1	3
Multiplication (c-3c)								0	2	2
Division (c-3d)	1	4						5	3	8
Fractions (c-4)		2		1				3	3	6
Addition (c-4a)								0	0	0
Subtraction (c-4b)								0	0	0
Multiplication (c-4c)								0	0	0
Division (c-4d)								1	0	1

TABLE IV (continued, p. 3)

Type of Study	d	s	c	a	r	f	e	Total	Cross References	Sum*
Decimals (c-5)		2					1	3	3	6
Percentage (c-6)	1	1					2	4	0	4
Ratio and proportion (c-7)		2						2	0	2
Measurement (c-8)		2					2	4	11	15
Negative numbers (c-9)							1	1	3	4
Algebra in elementary school (c-10)								0	3	3
Geometry in elementary school (c-11)		1					3	4	1	5
Sets (c-12)		1						1	3	4
Logic and proofs (c-13)		1		2		1	2	6	5	11
The decimal numeration systems (c-14)		1						1	2	3
Other numeration systems (c-15)							1	1	5	6
Probability and statistics (c-16)				2		1	1	4	0	4
Functions; graphing (c-17)								0	4	4
Basic arithmetic procedures in secondary school (c-20)					1	1		2	7	9
General Mathematics course (c-21)								0	29	29
Algebra course (c-22)	1	1			1		1	4	126	130
Geometry course (c-23)	2	1		3	1	1	1	9	73	82
Trigonometry course (c-24)								0	4	4
Calculus course (c-25)				1				1	1	2
Other courses (c-26)	2							2	2	4

TABLE IV (continued, p. 4)

Type of Study	d	s	c	a	r	f	e	Total	Cross References	Sum*
Other topics (c-30)								0	1	1
Subtotal	7	24	1	9	3	5	16	65	307	372
Textbooks (d-1)	9			1			1	11	23	34
Workbooks, other printed materials (d-2)	1			1			2	4	4	8
Manipulative devices, games (d-3)		1		2			2	5	10	15
Audio-visual devices (d-4)		2		4	1		6	13	8	21
Programmed instruction (d-5)				13	1	1	22	37	30	67
Computer-aided instruction (d-6)		1						1	0	1
Tutorial (d-6a)				1				1	4	5
Non-tutorial (d-6b)		1		1				2	3	5
Readability and vocabulary (d-7)	8	2		4	5		8	27	8	35
Quantitative concepts in other curricular areas (d-8)	4	2		2	2	1	1	12	11	23
Developmental projects (d-9)				2		1	3	6	25	31
Subtotal	22	9	0	31	9	3	45	119	126	245
Diagnosis (e-1)				1				1	2	3
Error analysis (e-1a)		12		1	1		1	15	12	27
Diagnostic procedures (e-1b)			1	2			1	4	4	8

TABLE IV (continued, p. 5)

Type of Study	d	s	c	a	r	f	e	Total	Cross References	Sum*
Remediation (e-2)		1	1	20				22	15	37
Low achiever, underachiever (e-2a)			1	7		1	3	12	10	22
Slow learner (e-2b)			1				2	3	2	5
Mentally retarded (e-2c)		1			1	2	1	5	7	12
Tutoring (e-2d)							1	1	1	2
Enrichment (e-3)		4		3	1		1	9	11	20
Overachiever (e-3a)								0	3	3
Acceleration (e-3b)		2		5		4	4	15	2	17
Grouping procedures (e-4)				4	1	2	6	13	13	26
Physical, psychological, and/or social characteristics (e-5)		17			4	12	3	36	14	50
Sex differences (e-6)		3		1	2	5		11	14	25
Socioeconomic differences (e-7)		1		1		1		3	10	13
Subtotal	0	41	4	45	10	27	23	150	120	270
Testing (f-1)					2			2	4	6
Analysis and validation of tests (f-1a)	2	6		3	19	2	1	33	16	49
Status testing (f-1b)		12		2		3		17	14	31
Achievement evaluation (f-2)		10		1	8	11		30	34	64
Related to age (f-2a)					2		1	3	4	7

TABLE IV (continued, p. 6)

Type of Study	d	s	c	a	r	f	e	Total	Cross References	Sum*
Related to intelligence (f-2b)		3			6			9	22	31
Related to prediction (f-2c)		3			40	2		45	23	68
Effect of parental knowledge (f-3)								0	3	3
Effect of teacher background (f-4)		3		1	1	1	1	7	9	16
Subtotal	2	37	0	7	78	19	3	146	129	275
Transfer (g-1)		1					4	5	6	11
Retention (g-2)		1		2	1	2	1	7	7	14
Generalization (g-3)		1					1	2	4	6
Thought processes (g-4)		4		4	5	1	8	22	19	41
Motivation (g-5)		2		1	1	5	5	14	8	22
Reinforcement (g-6)		2						2	0	2
Knowledge of results (g-6a)							2	2	2	4
Other procedures (g-6b)				1			4	5	1	6
Piagetian concepts (g-7)								0	1	1
Conservation (g-7a)								0	0	0
Development (g-7a-1)								1	0	1
Training (g-7a-2)								0	0	0
Relation to achievement (g-7a-3)								0	0	0
Transitivity (g-7b)							2	2	0	2

TABLE IV (continued, p. 7)

Type of Study	d	s	c	a	r	f	e	Total	Cross References	Sum*
Piagetian concepts:										
Classification and seriation (g-7c)								0	0	0
Other (g-7d)		1					1	2	2	4
Subtotal	0	13	0	8	7	8	28	64	50	114
Pre-service (t-1)								0	0	0
Competency levels (t-1a)		2			1	1		4	5	9
Preparation procedures (t-1b)		9				1		10	3	13
Attitudes (t-1c)								0	0	0
Characteristics (t-1d)								0	2	2
In-service (t-2)		1						1	0	1
Competency levels (t-2a)		9						9	5	14
In-service procedures (t-2b)		4		2				6	7	13
Attitudes (t-2c)		6						6	3	9
Characteristics (t-2d)		12			1			13	10	23
Subtotal	0	43	0	2	2	2	0	49	35	84
TOTALS	47	224	5	130	119	87	168	780	911	1691

*Total of Primary and Cross-References

Table V parallels Table IV: it presents data on the number of dissertations which were categorized in each mathematical topic. The totals by broad categories are:

	Primary	Cross	Total
Planning for Instruction	154	120	274
Content: Sequencing and Structuring	52	64	116
Content: Methods of Instruction	118	297	415
Materials	113	131	244
Individual Differences	79	77	156
Evaluating Progress	94	63	157
Learning Theory	46	38	84
Teacher Education	114	39	153
	770		

The number of dissertations which were categorized under each type of study is also indicated on Table V:

descriptive	109	
survey	147	
case study	3	
action	44	
correlational	87	
ex post facto	66	
experimental	203	
uncategorized	111	(insufficient information)

It is tempting to sum the data from the reports and dissertations, but the result would not be as meaningful as it seems, since many dissertations resulted in articles and thus duplication is present.

TABLE V

FREQUENCY OF DISSERTATIONS BY MATHEMATICAL TOPIC AND TYPE OF STUDY

Type of Study	d	s	c	a	r	f	e	un	Total	Cross References	Sum*
Historical developments (a-1)	17							8	25	24	49
Nature, values, and uses of mathematics (a-2)	2	2					1	2	7	9	16
Organizational patterns (a-3)		2		1		4	6		13	1	14
Teaching approaches (a-4)		1		1		6	43	6	57	23	80
Drill and practice (a-5a)							1		1	1	2
Problem solving (a-5b)		3			5	1	2	4	15	13	28
Estimation (a-5c)									0	0	0
Mental computation (a-5d)							1		1	0	1
Homework and supervised study (a-5e)							3		3	4	7
Review (a-5f)							1		1	0	1
Checking (a-5g)									0	0	0
Writing and reading numerals (a-5h)									0	0	0
Specification of objectives (a-5i)		1					1	1	3	5	8
Attitude, self-concept, and climate (a-6)		4		1	5	3	1		14	32	46
International comparisons (a-7)	11				2	1			14	8	22
Subtotal	30	13	0	3	12	15	60	21	154	120	274

TABLE V (continued, p. 2)

Type of study	d	s	c	a	r	f	e	un	Total	Cross References	Sum*
Pre-first grade concepts (b-1)									0	0	0
Readiness (b-2)							1		1	0	1
Content organization and inclusion (b-3)	14	16		2	1	2	1	7	43	48	91
Quantitative understanding (b-4)	2	1		1					4	11	15
Grade placement (b-5)							1		1	4	5
Time allotment (b-6)							3		3	1	4
Subtotal	16	17	0	3	1	2	6	7	52	64	116
Counting (c-1)									0	0	0
Number properties and relations (c-2)				1					1	11	12
Whole numbers (c-3)					1				1	4	5
Addition (c-3a)									0	1	1
Subtraction (c-3b)									0	2	2
Multiplication (c-3c)									0	3	3
Division (c-3d)									0	1	1
Fractions (c-4)								1	1	1	2
Addition (c-4a)									0	0	0
Subtraction (c-4b)									0	0	0
Multiplication (c-4c)									0	0	0
Division (c-4d)									0	0	0

TABLE V (continued, p. 3)

Type of Study	d	s	c	a	r	f	e	un	Total	Cross References	Sum*
Decimals (c-5)					1				1	1	2
Percentage (c-6)		1					3		4	1	5
Ratio and proportion (c-7)									0	2	2
Measurement (c-8)							4		4	7	11
Negative numbers (c-9)					1		1		2	4	6
Algebra in elementary school (c-10)									0	0	0
Geometry in elementary school (c-11)	1	2					2		5	3	8
Sets (c-12)							1		1	2	3
Logic and proofs (c-13)	2	1		2	1	3	4	1	14	15	29
The decimal numeration systems (c-14)									0	2	2
Other numeration systems (c-15)	1						1		2	4	6
Probability and statistics (c-16)				1	1	2	3	2	9	3	12
Functions; graphing (c-17)	3	1		2			2	1	9	6	15
Basic arithmetic procedures in secondary school (c-20)						2			2	7	9
General Mathematics course (c-21)								1	1	18	19
Algebra course (c-22)	2	2		3		2	2	6	17	92	109
Geometry course (c-23)	7			2			6	12	27	70	97
Trigonometry course (c-24)	2								2	3	5
Calculus course (c-25)				1				1	2	6	8
Other courses (c-26)	1	2		2		1			6	8	14

TABLE V (continued, p. 4)

Type of Study	d	s	c	a	r	f	e	un	Total	Cross References	Sum*
Other topics (c-30)	2			3			2		7	20	27
Subtotal	21	9	0	17	5	10	31	25	118	297	415
Textbooks (d-1)	13						2		15	27	42
Workbooks, other printed materials (d-2)							1	1	2	0	2
Manipulative devices, games (d-3)		1					6	2	9	10	19
Audio-visual devices (d-4)	1	1		1			6	3	12	3	15
Programmed instruction (d-5)	1	1		3	1		23		29	33	62
Computer-aided instruction (d-6)									0	0	0
Tutorial (d-6a)				1			1		2	3	5
Non-tutorial (d-6b)							4		4	1	5
Readability and vocabulary (d-7)		2		1			1	4	8	0	8
Quantitative concepts in other curricular areas (d-8)	2	2		2	6	2	5	3	22	5	27
Developmental projects (d-9)	5					3	2		10	49	59
Subtotal	22	7	0	8	7	5	51	13	113	131	244
Diagnosis (e-1)								1	1	3	4
Error analysis (e-1a)		1				1		2	4	3	7
Diagnostic procedures (e-1b)							2	2	4	2	6

TABLE V (continued, p. 5)

Type of Study	d	s	c	a	r	f	e	un	Total	Cross References	Sum*
Remediation (e-2)				1		1	1		3	5	8
Low achiever, underachiever (e-2a)			1		2	1	1	1	6	9	15
Slow learner (e-2b)							3	1	4	6	10
Mentally retarded (e-2c)		1			1		2		4	2	6
Tutoring (e-2d)				1			3		4	0	4
Enrichment (e-3)		3		2			3	1	9	5	14
Overachiever (e-3a)									0	2	2
Acceleration (e-3b)						3	2		5	5	10
Grouping procedures (e-4)		1		3		2	7	1	14	11	25
Physical, psychological, and/or social characteristics (e-5)		1			7	3	4		15	5	20
Sex differences (e-6)		1							1	10	11
Socioeconomic differences (e-7)		1				3	1		5	9	14
Subtotal	0	9	1	7	10	14	29	9	79	77	156
Testing (f-1)								1	1	2	3
Analysis and validation of tests (f-1a)	4	3			12		4		23	12	35
Status testing (f-1b)		5				3			8	5	13
Achievement evaluation (f-2)		2			3	2		11	18	6	24
Related to age (f-2a)					1				1	3	4

TABLE V (Continued, p. 6)

Type of Study	d	s	c	a	r	f	e	un	Total	Cross References	Sum*
Related to intelligence (f-2b)					2	1			3	12	15
Related to prediction (f-2c)					18	1		4	23	15	38
Effect of parental knowledge (f-3)					1	1	1		3	2	5
Effect of teacher background (f-4)		1		2	3	5	2	1	14	6	20
Subtotal	4	11	0	2	40	13	7	17	94	63	157
Transfer (g-1)									0	0	0
Retention (g-2)				1	1		1	1	4	2	6
Generalization (g-3)		1					1	1	3	1	4
Thought processes (g-4)	1	3		1	3		7	4	19	24	43
Motivation (g-5)		2				1	4	3	10	0	10
Reinforcement (g-6)								1	1	2	3
Knowledge of results (g-6a)							2		2	2	4
Other procedures (g-6b)									0	2	2
Piagetian concepts: Conservation (g-7a)					1				1	1	2
Development (g-7a-1)									0	0	0
Training (g-7a-2)							1		1	0	1
Relation to achievement (g-7a-3)									0	0	0
Transitivity (g-7b)									0	0	0

TABLE V (continued, p. 7)

Type of Study	d	s	c	a	r	f	e	un	Total	Cross References	Sum*
Piagetian concepts: Classification and seriation (g-7c)									0	1	1
Other (g-7d)		3				2			5	3	8
Subtotal	1	9	0	2	5	3	16	10	46	38	84
Pre-service (t-1)		1							1	0	1
Competency levels (t-1a)		2				1			3	4	7
Preparation procedures (t-1b)	9	10		1	3			5	28	7	35
Attitudes (t-1c)		1							1	0	1
Characteristics (t-1d)		2	1						3	1	4
In-service (t-2)	1								1	2	3
Competency levels (t-2a)		7			2			3	12	5	17
In-service procedures (t-2b)	4	19	1	1		2	2		29	7	36
Attitudes (t-2c)		2				1	1	1	5	4	9
Characteristics (t-2d)	1	28			2				31	9	40
Subtotal	15	72	2	2	7	4	3	9	114	39	153
TOTALS	109	147	3	44	87	66	203	111	770	829	1599

*Total of Primary and Cross-References

The twelve topics under which the most reports of research were categorized are:

	Primary	Total
Teaching approaches (a-4)	49	79
Problem solving (a-5b)	23	38
Attitude, self-concept, and climate (a-6)	28	57
Content organization and inclusion (b-3)	21	38
Programmed instruction (d-5)	37	67
Readability and vocabulary (d-7)	27	35
Remediation (e-2)	22	37
Physical, psychological, and/or social characteristics (e-5)	36	50
Analysis and validation of tests (f-1a)	33	49
Achievement evaluation (f-2)	30	64
Achievement evaluation related to prediction (f-2c)	45	68
Thought processes (g-4)	22	41

To these must be added Algebra (c-22) and Geometry (c-23), which were used as cross-references far more often than as primary references.

The twelve topics under which the most dissertations were categorized are:

	Primary	Total
Historical developments (a-1)	25	49
Teaching approaches (a-4)	57	80
Content organization and inclusion (b-3)	43	91
Geometry (c-23)	27	97
Programmed instruction (d-5)	29	62
Quantitative concepts in other curricular areas (d-8)	22	27
Analysis and validation of tests (f-1a)	23	35
Achievement evaluation related to prediction (f-2c)	23	38
Thought processes (g-4)	19	43
Pre-service preparation procedures (t-1b)	28	35
In-service procedures (t-2b)	29	36
Teacher characteristics (t-2d)	31	40

To these must be added Algebra (c-22), Textbooks (d-1), and Developmental Projects (d-9), all of which were used frequently as cross-references.

And in conclusion . . .

Two cautions must be stated, though they are obvious:

(1) More research does not necessarily mean better research.

(2) Knowing the topics on which the most research has been done does not necessarily mean that we therefore know a great deal about those topics.

The task of summarizing the "substantive information"--the results of the research--will be undertaken in other documents. For this compilation is not intended to be an end in itself: its "worth" lies only in its usefulness for others, both educators and researchers.

APPENDIX A

CATEGORIES AND CODING FOR MATHEMATICAL TOPIC

a. Planning for instruction

1. Historical developments
2. Nature, values, and uses of mathematics
3. Organizational patterns (departmentalized; multi-graded; self-contained; non-graded; team teaching)
4. Teaching approaches (modern, traditional; expository, discovery; rote, meaning; incidental, systematic; activity, mathematics laboratory; aptitude-treatment interaction)
5. Instructional procedures
    a. Drill and practice
    b. Problem solving
    c. Estimation
    d. Mental computation
    e. Homework and supervised study
    f. Review
    g. Checking
    h. Writing and reading numerals
    i. Specification of objectives
6. Attitude, self-concept, and climate

b. Content: sequencing and structuring

1. Pre-first grade concepts
2. Readiness
3. Content organization and inclusion
4. Quantitative understanding
5. Grade placement
6. Time allotment

c. Content: methods of instruction

1. Counting
2. Number properties and relations
3. Whole numbers
    a. Addition
    b. Subtraction
    c. Multiplication
    d. Division
4. Fractions
    a. Addition
    b. Subtraction
    c. Multiplication
    d. Division

5. Decimals
6. Percentage
7. Ratio and proportion
8. Measurement
9. Negative numbers (integers)
10. Algebra in elementary school
11. Geometry in elementary school
12. Sets
13. Logic and proofs
14. The decimal numeration systems
15. Other numeration systems
16. Probability and statistics
17. Functions; graphing
18. (Unassigned)
19. (Unassigned)
20. Basic arithmetic procedures in secondary school
21. General Mathematics course
22. Algebra course
23. Geometry course
24. Trigonometry course
25. Calculus course
26. Other courses
27. (Unassigned)
28. (Unassigned)
29. (Unassigned)
30. Other topics

d. Materials

1. Textbooks
2. Workbooks, other printed materials
3. Manipulative devices, games
4. Audio-visual devices
5. Programmed instruction
6. Computer-aided instruction
    a. Tutorial
    b. Non-tutorial
7. Readability and vocabulary
8. Quantitative concepts in other curricular areas
9. Developmental projects (SMSG, etc.)

e. Individual differences

1. Diagnosis
    a. Error analysis
    b. Diagnostic procedures

2. Remediation
   a. Low achiever, underachiever
   b. Slow learner
   c. Mentally retarded
   d. Tutoring
3. Enrichment
   a. Overachiever
   b. Acceleration
4. Grouping procedures (ability, homogeneous, individualized, flexible)
5. Physical, psychological, and/or social characteristics (anxiety)
6. Sex differences
7. Socioeconomic differences

f. Evaluating progress

1. Testing
   a. Analysis and validation of tests
   b. Status testing
2. Achievement evaluation
   a. Related to age
   b. Related to intelligence
   c. Related to prediction
3. Effect of parental knowledge
4. Effect of teacher background and characteristics

g. Learning theory

1. Transfer
2. Retention
3. Generalization
4. Thought processes (categorization, organization, creative and critical thinking, concept formation)
5. Motivation
6. Reinforcement
   a. Knowledge of results
   b. Other procedures
7. Piagetian concepts
   a. Conservation
      1) Development
      2) Training
      3) Relation to achievement
   b. Transitivity
   c. Classification and seriation
   d. Other

t. Teacher education

1. Pre-service
    a. Competency levels
    b. Preparation procedures
    c. Attitudes
    d. Characteristics
2. In-service
    a. Competency levels
    b. In-service procedures
    c. Attitudes
    d. Characteristics

p. Other post-secondary education

1. Mathematical background
2. College mathematics instruction
3. Vocational training

m. Mathematics

1. Philosophy and theory
2. Persons and texts
3. Topics (content)
4. Other

r. References

1. Bibliographical lists
2. Summaries and reviews

APPENDIX B

CATEGORIES AND CODING FOR TYPE OF STUDY

d	Descriptive:	research in which the researcher reports on records which may have been kept by someone else; includes reviews, historical studies, and textbook analyses or comparisons
s	Survey:	research which attempts to find characteristics of a population by asking a sample through the use of a questionnaire or interview; includes also the status study, in which a group is investigated as it is to ascertain pertinent characteristics (measures assigned variable only)
c	Case study:	research in which the researcher describes in depth what is happening to one designated unit, usually one child
a	Action research:	research which uses nominal controls; generally teacher or school originated; procedures of actual practice may be described
r	Correlational:	research which studies relationships between or among two or more variables; uses correlational statistic primarily
f	Ex post facto:	research in which the independent variable or variables were manipulated in the past; the researcher starts with the observation of a dependent variable or variables. He then studies the independent variables in retrospect for their possible effects on the dependent variables. (He may examine interrelationships of two or more assigned variables or two or more levels of one assigned variable)
e	Experimental:	research in which the independent variable or variables are manipulated by the researcher to quantitatively measure their effect on some dependent variable or variables, to test a logically derived hypothesis

APPENDIX C

CATEGORIES AND CODING FOR DESIGN PARADIGM

1.1* One-shot study, no control group (posttest only)
1.2 One group pretest-posttest
1.3 Static group comparison

			to treatment	in analysis
2.1	Pretest-posttest	control group	matched	n = classes
2.2	"	"	"	n = students
2.3	"	"	randomized	n = classes
2.4	"	"	"	n = students
2.5	Posttest only	control group	matched	n = classes
2.6	"	"	"	n = students
2.7	"	"	randomized	n = classes
2.8	"	"	"	n = students
2.9	Pretest-posttest	three or more groups	matched	n = classes
2.10	"	"	"	n = students
2.11	"	"	randomized	n = classes
2.12	"	"	"	n = students
2.13	Posttest only	three or more groups	matched	n = classes
2.14	"	"	"	n = students
2.15	"	"	randomized	n = classes
2.16	"	"	"	n = students
2.17	Solomon's Four Group			
2.18	Pretest-posttest	own control	randomized	
2.19	Posttest only	own control	randomized	
3.1	Pretest-posttest	control group	matched	nc or uc**
3.3	"	"	randomized	nc or uc
3.4	"	"	insufficient information re n	
3.5	Posttest only	control group	matched	nc or uc
3.7	"	"	randomized	nc or uc
3.8	"	"	insufficient information re n	
3.9	Pretest-posttest	three or more groups	matched	nc or uc
3.11	"	"	randomized	nc or uc
3.12	"	"	insufficient information re n	
3.13	Posttest only	three or more groups	matched	nc or uc
3.15	"	"	randomized	nc or uc
3.16	"	"	insufficient information re n	
3.17	Solomon's Four Group			nc or uc
3.18	Pretest-posttest	own control	insufficient information re n	
3.19	Posttest only	own control	insufficient information re n	
3.21	Pretest-posttest	non-equivalent control group		
3.22	Posttest only	non-equivalent control group		
3.23	Pretest-posttest, separate sample			

3.25 Counterbalanced
3.27 Time series (repeated measures)
3.28 Equivalent time samples
3.29 Equivalent materials samples

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*r: placed after numeral to indicate retention test was administered.

**nc: not correct; n = students when sampling unit seems to be classes.
uc: undertain which n was used in data analysis.

APPENDIX D

CATEGORIES AND CODING FOR STATISTICAL PROCEDURE

a. Descriptive types of measures
   1.1 Raw scores, frequency distributions
   1.2 Difference between scores
   1.3 Medians
   1.4 Means
   1.5 Difference between means or medians
   1.6 Percentages
   1.7 Proportions or ratios
   1.8 Quartiles
   1.9 Ranks
   1.10 Percentiles and deciles
   1.11 Q-Sort
   1.12 Standard scores

b. Inferential types of tests
   2.1 Chi square one-sample test ("goodness of fit")
   2.2 Contingency Coefficient
   2.3 Fisher's Exact Probability for 2 x 2 Tables
   2.4 McNemar's Test for Significance of Changes
   2.5 Cochran's Q Test for Several Related Proportions
   2.6 Chi square Test for Independence
   2.7 Methods for Maximizing Probability of Correct Classification
   2.8 McNemar's Test for Non-Independent Proportions
   2.9 Behrens-Fisher Test of Equality of Means on a Personality Test
   2.10 Tukey Gap Test
   2.11 Kolmogorov-Smirnov Two-Sample Test
   2.12 McCall's T-Scale

   3.1 Pearson's Resolution of Mixed Gaussian Series
   3.2 Analysis of Variance
   3.3 F-test
   3.4 t-test
   3.5 Analysis of Covariance (including multivariate)
   3.6 Scheffe's Multiple Comparison Procedure
   3.7 Tukey's Multiple Comparison Procedure
   3.8 Hotelling's T
   3.9 Mahalonobis' D^2
   3.10 Fisher's Discriminant Function
   3.11 Rao's V_k
   3.12 Multiple Discriminant Analysis
   3.13 Multiple Regression Analysis
   3.14 Multiple Discriminant Function
   3.15 z-test, Critical Ratio
   3.16 Cochran-Cox test
   3.17 Probable error

3.18 Probable error ratio
3.19 Welch-Nayer test for homogeneity of variability
3.20 Duncan's Multiple Range Test (Kramer's extension)
3.21 Newman-Keuls Multiple Comparison

4.1 Sign test
4.2 Median test
4.3 Mann-Whitney U Test
4.4 Kruskal-Wallis One-way AOV
4.5 Friedman's Two-way AOV
4.6 Wilcoxon's Matched-pairs Signed-ranks Test
4.7 Wilcoxon's Test of Significance for Unpaired Replicates
4.8 Scalogram analysis

5.1 Kendall's Coefficient of Concordance (W)
5.2 Spearman's Rank Correlation (rho)
5.3 Kendall's Rank Correlation (tau)
5.4 Cattell's Coefficients of Pattern Similarity

6.1 Factor analysis
6.2 Regression analysis (including 'stepwise')
6.3 Multiple correlation
6.4 Correlation
6.5 Phi coefficient
6.6 Wherry Doolittle Test Selection Method (for multiple correlation)
6.7 Johnson-Neyman Technique

APPENDIX E

INSTRUMENT FOR EVALUATING EXPERIMENTAL RESEARCH REPORTS

Directions:

Evaluate with the nine underlined questions which follow. The quality of the research report in terms of each question should be rated on a five-point scale. The specifications for these five points are:

1) Excellent:	all requirements for the question are met; nothing essential could be added
2) Very good:	most requirements are met
3) Good:	some requirements are met
4) Fair:	a few requirements are met
5) Poor:	none or too few of the requirements are met

Certain "key points" should be considered in ascertaining a rating for each question. These are listed below the question, followed by adjectives which indicate the continuum on which the "key point" should be assessed. Do NOT make a response to these "key points". They are intended to focus the attention of all raters on the same pertinent aspects of each question.

Please make only nine responses for each article, one for each question.

Instrument for Evaluating Experimental Research Reports

Marilyn N. Suydam
The Pennsylvania State University

1. How practically or theoretically significant is the problem? (1-2-3-4-5)

a. Purpose	(important---non-important)
b. Problem origin	
1) Rationale	(logical---illogical)
2) Previous research	(appropriate---inappropriate)

2. How clearly defined is the problem? (1-2-3-4-5)

a. Question	(operational---vague)
b. Hypothesis(es)	(relevant---irrelevant) (logical---illogical)
c. Independent variable(s)	(relevant---irrelevant)
d. Dependent variable(s)	(operational---vague) (relevant---irrelevant)

3. How well does the design answer the research question? (1-2-3-4-5)

a. Paradigm	(appropriate---inappropriate)
b. Hypothesis(es)	(testable---untestable)
c. Procedures	(clear---unclear)
d. Treatments	(replicable---unreplicable) (appropriate---inappropriate)
e. Duration	(appropriate---inappropriate)

4. How adequately does the design control variables? (1-2-3-4-5)

a. Independent variable(s)	(uncontaminated---contaminated)
b. Administration of treatment	(rigorous---unrigorous)
c. Teacher or group factors	(controlled---uncontrolled)
d. Subject or experimenter bias	(controlled---uncontrolled)
e. Halo effect	(controlled---uncontrolled)
f. Extraneous factors	(controlled---uncontrolled)
g. Individual factors	(controlled---uncontrolled)

5. How properly is the sample selected for the design and purpose of the research? (1-2-3-4-5)

a. Population	(appropriate---inappropriate)
b. Drawing of sample	(random---unspecified)
c. Assignment of treatment	(random---unspecified)
d. Size	(appropriate---inappropriate)
e. Characteristics	(appropriate---inappropriate)

6. How valid and reliable are the measuring instruments or observational techniques? (1-2-3-4-5)

a. Instrument or technique	
1) Description	(excellent---poor)
2) Validity	(appropriate---inappropriate)
3) Reliability for population	(excellent---poor)
b. Procedure of data collection	(careful---careless)

7. How valid are the techniques of analysis of data? (1-2-3-4-5)

a. Statistical tests	
1) Basic assumptions	(satisfied---unclear)
2) Relation to design	(appropriate---inappropriate)
b. Data	
1) Treatment	(appropriate---inappropriate)
2) Presentation	(clear---unclear)
3) Level of significance	(appropriate---inappropriate) (specified---unspecified)
4) Discussion	(accurate---inaccurate)

8. How appropriate are the interpretations and generalizations from the data? (1-2-3-4-5)

a. Consistency with results	(excellent---poor)
b. Generalizations	(reasonable---exaggerated)
c. Implications	(reasonable---exaggerated)
d. Limitations	(noted---not noted)

9. How adequately is the research reported? (1-2-3-4-5)

a. Organization	(excellent---poor)
b. Style	(clear---vague)
c. Grammar	(good---poor)
d. Completeness	(excellent---poor) (replicable---unreplicable)

APPENDIX F

LIST OF ABBREVIATIONS FOR JOURNALS CITED

American Education	Am. Ed.
American Educational Research Journal	Am. Ed. Res. J.
American Journal of Mental Deficiency	Am. J. Ment. Def.
American Mathematical Monthly	Am. Math. Monthly
Arithmetic Teacher	Arith. Teach.
AV Communication Review	AV Comm. R.
Audiovisual Instruction	AV Inst.
California Journal of Educational Research	Calif. J. Ed. Res.
Catholic Education Review	Catholic Ed. R.
Chicago Schools Journal	Chicago Sch. J.
Child Development	Child Develop.
Clearing House	Clearing House
Contemporary Education	Contemp. Ed.
Education of the Visually Handicapped	Ed. Vis. Handicapped
Educational Administration and Supervision	Ed. Adm. & Sup.
Educational Method	Ed. Meth.
Educational Outlook	Ed. Outlook
Educational and Psychological Measurement	Ed. & Psychol. Meas.
Educational Research Bulletin	Ed. Res. B.
Elementary School Journal	El. Sch. J.
ERIC Documents	ERIC Documents
Exceptional Children	Excep. Child.

Graduate Research in Education and Related Disciplines	Grad. Res. in Ed. & Related Disciplines
Harvard Educational Review	Harvard Ed. R.
High Points	High Points
Indiana University School of Education Bulletin	Ind. U. Sch. Ed. B.
Journal of Applied Psychology	J. Appl. Psychol.
Journal of Clinical Psychology	J. Clin. Psychol.
Journal of Educational Measurement	J. Ed. Meas.
Journal of Educational Psychology	J. Ed. Psychol.
Journal of Educational Research	J. Ed. Res.
Journal of Experimental Child Psychology	J. Exp. Child Psychol.
Journal of Experimental Education	J. Exp. Ed.
Journal of Experimental Psychology	J. Exp. Psychol.
Journal of Genetic Psychology	J. Genet. Psychol.
Journal for Research in Mathematics Education	J. Res. Math. Ed.
Journal of Research Services	J. Res. Services
Journal of School Psychology	J. Sch. Psychol.
Journal of Social Psychology	J. Soc. Psychol.
Journal of Speech Disorders	J. Speech Dis.
Journal of Teacher Education	J. Teach. Ed.
Mathematics Teacher	Math. Teach.
Peabody Journal of Education	Peabody J. Ed.
Perceptual Motor Skills	Perceptual Motor Skills
Personnel and Guidance Journal	Personnel & Guid. J.

Pittsburgh Schools	Pittsburgh Sch.
Psychological Reports	Psychol. Reports
Psychology in the Schools	Psychol. in Sch.
School Board Journal	Sch. Bd. J.
School and Community	Sch. & Com.
School Executive	Sch. Exec.
School Review	Sch. R.
School Science and Mathematics	Sch. Sci. Math.
School and Society	Sch. & Soc.
Science Education	Sci. Ed.
Supplementary Educational Monographs	Suppl. Ed. Monog.
Teachers College Record	Teach. Col. Rec.
Texas Outlook	Tex. Outlook
Training School Bulletin	Training Sch. B.
Wisconsin Journal of Education	Wisc. J. Ed.

APPENDIX G

ALPHABETICAL LIST OF DISSERTATIONS ON SECONDARY SCHOOL MATHEMATICS

Abeles, Francine. College Preparatory Programs in Geometry of Four Nations: A Critique for the Study of U.S.A. Programs. (Columbia U., 1964.) *Dis. Abst.* 25: 4567-4568; Feb. 1965. (a-7; b-3, c-23, d-1)

Abeles, Sigmund. The Utilization of Certain Mathematical Skills in the Solution of Selected Problems in Physics: A Comparison of the Ability of Selected Groups of Physical Science Study Committee Physics Students and New York State Regents Physics Students to Solve Problems in Physics Involving the Use of Mathematical Skills. (New York U., 1966.) *Dis. Abst.* 27A: 2435-2436; Feb. 1967. (d-8)

Ackerson, Paul Berndt. A Study of the Relationship Between Achievement in PSSC Physics and Experience in Recently Developed Courses in Science and Mathematics. (Oklahoma State U., 1965.) *Dis. Abst.* 27A: 44; July 1966. (ERIC Document No. ED 013 756) (d-8; d-9)

Ahmad, Saleh. A Comparative Study of the Changes in the Foundations and Fundamental Concepts of the Euclidean Plane Geometry. (Colorado State College, 1969.) *Dis. Abst.* 31B: 275-276; July 1970. (d-1; a-7, c-23)

Aijaz, Saiyid Mohammad. Predictive Validity of the Three Versions of the "Verbal Reasoning" and the "Numerical Ability" Subtests of the *Differential Aptitude Tests* for East Pakistan. (Colorado State College, 1963.) *Dis. Abst.* 24: 1068-1069; Sept. 1963. (f-1a; a-7)

Alam, Sami Jamil. A Comparative Study of Gifted Students Enrolled in Separate and Regular Curriculums. (Wayne State U., 1968.) *Dis. Abst.* 29A: 3354; Apr. 1969. (e-4; e-3b)

Albrecht, Walter August, Jr. A Critical and Historical Study of the Role of Ruler and Compass Constructions in the Teaching of High School Geometry in the United States. (Ohio State U., 1952.) *Dis. Abst.* 18: 157-160; Jan. 1958. (c-23; a-1, d-1, d-3)

Alexander, Vincent Eugene. The Relationship of Selected Factors to the Ability to Solve Problems in Arithmetic. (U. Southern California, 1959.) *Dis. Abst.* 20: 1221; Oct. 1959. (a-5b)

Ali, Md Basharat. To Establish the Feasibility of Using Translated and Adapted Versions of an American-Made Mathematics Achievement Test in East Pakistan. (Colorado State College, 1964.) *Dis. Abst.* 28A: 115-116; July 1967. (a-7; f-1a)

*Alkire, G. Don. Functional Competence in Mathematics. (U. Kansas, 1953.) (f-2; c-20, e-6)

Alsaqqar, Abdulhameed Mohammed. New Direction for Iraqi Intermediate School Mathematics. (Syracuse U., 1963.) Dis. Abst. 25: 3908; Jan. 1965. (a-7; d-9)

Alspaugh, John William. A Survey of Secondary Mathematics Programs in Missouri with Emphasis on Content, Procedures, and Preparation of Teachers. (U. Missouri, 1965.) Dis. Abst. 26: 5259-5260; Mar. 1966. (t-2d; b-4, t-2a)

Alston, Melvin O. Vitalizing Verbal Problem Material; A Manual for Use in Analyzing, Selecting, Teaching, and Appraising Verbal Problem Materials in Ninth Grade Algebra. (Columbia U., 1944.) (a-5b; c-22)

Amidon, Edmund James. Dependent-Prone Students in Experimental Learning Situations. (U. Minnesota, 1959.) Dis. Abst. 20: 2095; Dec. 1959. (a-4; c-23, f-4)

Anderson, George R. Visual-Tactual Devices: Their Efficacy in Teaching Area, Volume and the Pythagorean Relationship to Eighth Grade Children. (Pennsylvania State U., 1957.) Dis. Abst. 18: 160-161; Jan. 1958. (d-3; a-6, c-8)

Anderson, Richard Mark. A Study of Cadet Teaching as a Method to Improve the Multiplication and Division Proficiency of a Selected Sample of Junior High School Students. (U. Iowa, 1970.) Dis. Abst. 31A: 2782; Dec. 1970. (e-2d; c-3c, c-3d, e-2)

Anderson, Robert Arnold. Mathematical Student Achievement of Third Form (Ninth Grade) Students in London and St. Paul-Minneapolis Metropolitan Areas. (U. Minnesota, 1964.) Dis. Abst. 25: 5008; Mar. 1965. (a-7)

Anderson, Tommie Marie. The Achievement in Mathematics and Science of Students in the Negro Schools and Colleges in Mississippi. (Indiana U., 1958.) Dis. Abst. 19: 2281; Mar. 1959. (f-2; e-7)

Anglin, John Bennett. The Value of Selected Ninth Grade Tests and Algebra Grades in Predicting Success in Modern Geometry. (Indiana U., 1966.) Dis. Abst. 27A: 1696; Dec. 1966. (f-2c; c-22, c-23)

Annis, Richard Hayes. Applicability Ratings of College Mathematics Courses for Secondary School Mathematics Teacher Preparation. (U. North Dakota, 1965.) Dis. Abst. 26: 5889-5890; Apr. 1966. (t-2a)

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*The asterisk indicates that the dissertation was not included in the categorized listing; generally, the study was located after that listing had been typed.

Anttonen, Ralph George. An Examination Into the Stability of Mathematics Attitude and Its Relationship to Mathematics Achievement from Elementary to Secondary School Level. (U. Minnesota, 1967.) Dis. Abst. 28A: 3011-3012; Feb. 1968. (a-6; t-1a)

Ashbaugh, William Hatch. The Effect Upon Achievement of Written Responses to Programed Learning Material for Students of Differing Academic Ability. (Pennsylvania State U., 1962.) Dis. Abst. 23: 3987; Apr. 1963. (d-5)

Ashton, Sister Madeleine Rose. Heuristic Methods in Problem Solving in Ninth Grade Algebra. (Stanford U., 1962.) Dis. Abst. 22: 4289; June 1962. (a-4; a-5b, c-22)

Atkins, Robert Adville. A Follow-Up Study of Graduates of the General Electric Mathematic Fellowship Program. (New York U., 1960.) Dis. Abst. 21: 3001; Apr. 1961. (t-2b)

Ayers, Gerald Hamilton. The Development and Evaluation of an Exploratory Course in Mathematics for Purposes of Educational Guidance in the Junior High School. (U. Southern California, 1934.) (a-4)

Ayre, Henry G. An Analytical Study of Individual Differences in Plane Geometry. (George Peabody College for Teachers, 1939.) (c-23; e-1)

Babbott, Edward French. The Differential Effectiveness of Eight 9th Grade Variables in Predicting Success in Three 10th Grade Academic Subjects at Summit High School: A Study in Differential Prediction. (New York U., 1963.) Dis. Abst. 25: 993-994; Aug. 1964. (f-2c; c-23)

Bachman, Alfred Morry. Factors Related to the Achievement of Junior High School Students in Mathematics. (U. Oregon, 1968.) Dis. Abst. 29A: 2139; Jan. 1969. (a-3; a-6, e-4, f-2b, f-4)

Badger, Blanche Crisp. An Analysis of the Evolving Evaluation Program in Elementary Geometry. (George Peabody College for Teachers, 1956.) Dis. Abst. 17: 571; Mar. 1957. (c-23; f-1a)

Bailey, Herman Perry. A Study of the Effectiveness of Ability Grouping on Success in First Year Algebra. (St. Louis U., 1967.) Dis. Abst. 28A: 3061-3062; Feb. 1968. (e-4; c-22, f-2c)

Bailey, Lawrence G. The Evaluation of a Technique of Study for First Year Algebra. (U. Wisconsin, 1931.) (c-22; a-5e)

Baker, Russell Ray. Program Provisions in Michigan Junior High School for Superior Students in Mathematics. (U. Michigan, 1961.) Dis. Abst. 22: 470-471; Aug. 1961. (e-3; c-22, e-3b)

*Balemenos, Richard H. An Experimental Study Comparing the Effectiveness of Teaching Deduction in Two Content Areas of Secondary Mathematics. (Harvard U., 1961.) (c-13)

Ballew, Julius Hunter. A Study of the Effect of Discovery Learning Upon Critical Thinking Abilities of High School Algebra Students. (U. North Carolina at Chapel Hill, 1965.) Dis. Abst. 26: 3775; Jan. 1966. (a-4; c-22, g-4)

Barbeau, Alice Mae. A Historical Approach to the Theory of Groups. (U. Wisconsin, 1968.) Dis. Abst. 29B: 4737; June 1969. (t-1b; a-1, c-23, t-2b)

Barcaski, Peter Bartholomew. Cognitive and Motivational Factors, Methods of Teaching, and Their Effects on Achievement, Transfer, and Retention of Pre-Sequenced Concepts. (Columbia U., 1969.) Dis. Abst. 31A: 639; Aug. 1970. (a-4; c-15)

Barnes, Ward Ewing. A Study of the Variables That Influence Secondary Public School Mathematics Teachers in Pennsylvania to Remain in or Leave the Teaching Profession During 1968-69. (U. Pittsburgh, 1969.) Dis. Abst. 31A: 50-51; July 1970. (t-2d)

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Barto, Joseph Allan. The Mathematics Program in Selected Junior High Schools, 1958-1965. (U. Nebraska Teachers College, 1966.) Dis. Abst. 27A: 3244-3245; Apr. 1967. (b-3; a-1)

Baughman, Gerald Don. Germane Material Criteria for Promoting the General Heuristic Cognitive Theme of the Cambridge Conference on School Mathematics. (Claremont Grad. School and U. Center, 1967.) Dis. Abst. 29A: 506-507; Aug. 1968. (g-4; a-4, a-5b, d-9)

Beamish, Eric Edward. A Short Study Film for Teaching the Solution of Simple Problems in Multiplication Using the C and D Scales of the Slide Rule. (Columbia U., 1967.) Dis. Abst. 28A: 4520-4521; May 1968. (d-4; c-3c)

Beane, Donald Gene. A Comparison of Linear and Branching Techniques of Programed Instruction in Plane Geometry. (U. Illinois, 1962.) Dis. Abst. 23: 4252-4253; May 1963. (d-5; c-23)

Beard, Earl M. L. An Axiom System for High School Geometry Based on Isometries. (U. Wisconsin, 1968.) Dis. Abst. 29A: 1667-1668; Dec. 1968. (ERIC Document No. ED 028 926) (c-23)

Beaton, Mary Anne. A Study of Underachievers in Mathematics at the Tenth Grade Level in Three Calgary High Schools. (Northwestern U., 1966.) Dis. Abst. 27A: 3215-3216; Apr. 1967. (e-2a; a-6, f-3)

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Beberman, Max. The Teaching of Statistics in Secondary School Mathematics. (Teachers College, Columbia U., 1952.) (c-16)

Bechtold, Charles August. The Use of Extraneous Material in Developing Problem-Solving Ability of Pupils in Algebra I. (Columbia U., 1965.) Dis. Abst. 26: 3105; Dec. 1965. (a-5b; c-22)

Becker, Jerry Page. An Attempt to Design Instructional Techniques in Mathematics to Accommodate Different Patterns of Mental Ability. (Stanford U., 1967.) Dis. Abst. 28A: 957-958; Sept. 1967. (a-4; c-22, c-30, d-5)

Beckman, Milton William. The Level of Mathematical Competency and Relative Gains in Competency of Pupils Enrolled in Algebra and General Mathematics. (U. Nebraska, 1951.) (f-2; c-21, c-22)

Bedwell, Thomas Howard. A Critical Analysis of the Physical Science and Supporting Mathematics Instruction in the Secondary Schools of South Dakota. (U. Nebraska, 1966.) Dis. Abst. 27A: 1696-1697; Dec. 1966. (ERIC Document No. ED 019 211) (d-8; a-1)

Beeson, Richard O'Neil, Jr. Immediate Knowledge of Results and Test Performance. (U. Arkansas, 1970.) Dis. Abst. 31A: 920; Sept. 1970. (g-6a)

Behr, Merlyn James. A Study of Interactions Between "Structure-of-Intellect" Factors and Two Methods of Presenting Concepts of Modulus Seven Arithmetic. (Florida State U., 1967.) Dis. Abst. 28A: 1698; Nov. 1967. (g-4; c-15, d-5)

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Beninati, Albert F. A Study of Articulation Between College and High School Mathematics. (Columbia U., 1963.) Dis. Abst. 25: 317-318; July 1964. (b-3; a-1, d-9)

Beougher, Elton Earl. Relationships Between Success of Advanced Placement Mathematics Programs and Various Administrative, School and Community Factors. (U. Michigan, 1968.) Dis. Abst. 30A: 195-196; July 1969. (c-26; c-25, e-2)

Berenberg, Albert N. A Study of the Relationship Between Skills in Certain Cognitive Areas and Certain Patterns Involving Attitudes, Interests and Identifications in Eighth Grade Students. (New York U., 1957.) Dis. Abst. 18: 651-652; Feb. 1958. (e-5; a-6)

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Berg, Milton Edward. A Plan for the Mathematical Education of Teachers of Secondary School Mathematics in the State of Oklahoma. (Columbia U., 1964.) Dis. Abst. 26: 207; July 1965. (t-1b; a-1)

Berger, Emil Joseph. An Investigation of the Effectiveness of Televised Presentations of Self-Contained Television-Adapted Lessons on Enrichment Topics in Mathematics. (U. Minnesota, 1962.) Dis. Abst. 23: 1552-1553; Nov. 1962. (d-4; c-22, c-23, e-3)

Bernabei, Raymond. A Logical Analysis of Selected Achievement Tests in Mathematics. (Western Reserve U., 1966.) Dis. Abst. 27A: 4121-4122; June 1967. (f-1a; d-9)

Bernstein, Allen L. A Study of Remedial Arithmetic Conducted with Ninth Grade Students. (Wayne U., 1955.) Dis. Abst. 15: 1567-1568; Sept. 1955. (e-2; e-1b, e-4)

Beste, Celestine A. A Critical Appraisal of Programmed Learning in Relationship to Secondary School Geometry. (Catholic U. America, 1963.) Dis. Abst. 24: 4048; Apr. 1964. (d-5; c-23)

Bezdek, Jim Joseph. A Comparison of Two Approaches to the Teaching of Plane and Solid Geometry. (Cornell U., 1966.) Dis. Abst. 28A: 150-151; July 1967. (b-5; c-23)

Biddle, John Charles. Effectiveness of Two Methods of Instruction of High School Geometry on Achievement, Retention, and Problem Solving Ability. (Indiana U., 1966.) Dis. Abst. 27A: 3356; Apr. 1967. (d-5; c-23)

Bierden, James Edward. Provisions for Individual Differences in Seventh Grade Mathematics Based on Grouping and Behavioral Objectives: An Exploratory Study. (U. Michigan, 1968.) Dis. Abst. 30A: 196-197 July 1969. (e-4; a-5i)

Birr, Donald James. The Effects of Treatments by Parents and Teachers on the Self-Concept of Ability Held by Underachieving Early Adolescent Pupils. (Michigan State U., 1969.) *Dis*. *Abst*. 30A: 1354; Oct. 1969. (a-6; f-3, f-4)

Bjork, Clarence Milford. A Survey of State, College, and Municipal Requirements for High School Teachers of Mathematics (Grades Nine to Twelve). (Columbia U., 1950.) (t-2a)

Blair, Frank S. A Comparison of Programmed Instruction and the Conventional Lecture-Discussion Method of Instruction in Teaching Algebra I in the Ogden City Schools. (Brigham Young U., 1963.) *Dis*. *Abst*. 24: 4465-4466; May 1964. (a-4; c-22, d-5)

Blocker, Richard Daniel, Jr. Religious Content in State-Approved Textbooks Used in American Public Secondary Schools in the Fields of Language Arts, Mathematics, Science, and Social Studies During the Year 1966. (American U., 1968.) *Dis*. *Abst*. 29A: 1144-1145; Oct. 1968. (d-8; d-1)

Bobier, Darold Thomas. The Effectiveness of the Independent Use of Programmed Textbooks in Aiding Students to Overcome Skill Weaknesses in English Mechanics and Arithmetic. (U. Denver, 1964.) *Dis*. *Abst*. 25: 3424-3425; Dec. 1964. (e-1b; d-5)

Boe, Barbara Lamphere. A Study of the Ability of Secondary School Pupils to Perceive the Plane Sections of Selected Solid Figures. (U. Wisconsin, 1966.) *Dis*. *Abst*. 28A: 387; Aug. 1967. (g-7d; c-23, c-30)

Boles, Ralph C. Some Relationships Between Size of School and Academic Achievement of High School Seniors in Florida. (U. Florida, 1952.) (f-2)

Bolser, Frank Curtis. Education in the Field of Mathematics in the USSR. (U. Florida, 1959.) *Dis*. *Abst*. 22: 2704; Feb. 1962. (a-7; b-3)

Bompart, Billy Earl. The Development of an Undergraduate Program for Prospective Secondary School Mathematics Teachers Based on an Analysis of State Certification Requirements. (U. Texas, 1967.) *Dis*. *Abst*. 28A: 4020; Apr. 1968. (t-2b)

Bowen, Collin Weldon. The Use of Self-Estimates of Ability and Measures of Ability in the Prediction of Academic Performance. (Oklahoma State U., 1968.) *Dis*. *Abst*. 30A: 978; Sept. 1969. (f-2c)

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Bradley, A. Day. Geometry of Repeating Design and Geometry of Design for High Schools. (Teachers College, Columbia U., 1932.) (c-23; m-3)

Bradshaw, Charles Kenneth. Mathematics Teaching in the Public Secondary Schools of the State of Nevada. (U. California, Berkeley, 1968.) *Dis. Abst.* 29A: 1148; Oct. 1968. (t-2d; t-2a)

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Bree, David Sidney. The Understanding Process as Seen in Geometry Theorems. (Carnegie-Mellon U., 1969.) *Dis. Abst.* 30A: 1675; Nov. 1969. (g-4; c-13, c-23)

Bridges, Charles Martin. The Application of Elementary Statistics in Analysis of Data by Selected Secondary School Students. (U. Tennessee, 1959.) *Dis. Abst.* 20: 1223; Oct. 1959. (c-16)

Brinke, Dirk Pieter Ten. Homework: An Experimental Evaluation of the Effect on Achievement in Mathematics in Grades Seven and Eight. (U. Minnesota, 1964.) *Dis. Abst.* 27A: 4176; June 1967. (a-5e)

Brinkmann, Erwin Henry. Educability in Visualization of Objects in Space: A Programmed Instruction Approach. (U. Michigan, 1963.) *Dis. Abst.* 24: 2355-2356; Dec. 1963. (d-5; c-23)

Brockman, Harold William. A Critical Study of the Use of the Terms "Necessary Conditions" in the Teaching of Mathematics. (Ohio State U., 1962.) *Dis. Abst.* 24: 193-194; July 1963. (t-2b; c-13, c-25)

Brown, Betty Irene. A Study in Mental Arithmetic: Proficiency and Thought Processes of Pupils Solving Subtraction Examples. (U. Pittsburgh, 1957.) *Dis. Abst.* 17: 2219; Oct. 1957. (a-5d; c-3b, e-2a, e-3a)

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Brown, Jean Fleming. The Construction and Teaching of a Combined Course in Plane and Solid Geometry for the Tenth Year: An Experimental Study. (New York U., 1934.) (b-3; c-23)

Brown, John Arthur. Theoretical Topics in Mathematics at the Eighth Grade Level. (U. Wisconsin, 1957.) Dis. Abst. 17: 1956; Sept. 1957. (b-4; a-4, c-2, c-4, c-5, c-13)

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Brown, Robert Carl. Functional Competence in Mathematics of Louisiana High School Seniors. (George Peabody College for Teachers, 1956.) Dis. Abst. 17: 861-862; Apr. 1957. (f-1b; c-20, e-1a)

Brownman, David E. Measurable Outcomes of Two Methods of Teaching Experimental Geometry: A Controlled Experiment with Parallel Equated Groups to Determine Immediate and Remote Achievement of the Lecture-Demonstration and Individual-Laboratory Methods. (New York U., 1938.) (a-4; c-23, g-2)

Bruni, James Vincent. A Study of Mathematical Education in the Public Elementary and Secondary Schools of Italy. (Columbia U., 1967.) Dis. Abst. 28B: 3368-3369; Feb. 1968. (a-7; a-4)

Brunsvold, Perley Olandus. The Relationship Between Selected School District Variables and Teacher Assignment Based on Preparation. (U. Iowa, 1966.) Dis. Abst. 27A: 341-342; Aug. 1966. (t-2d)

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